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finish

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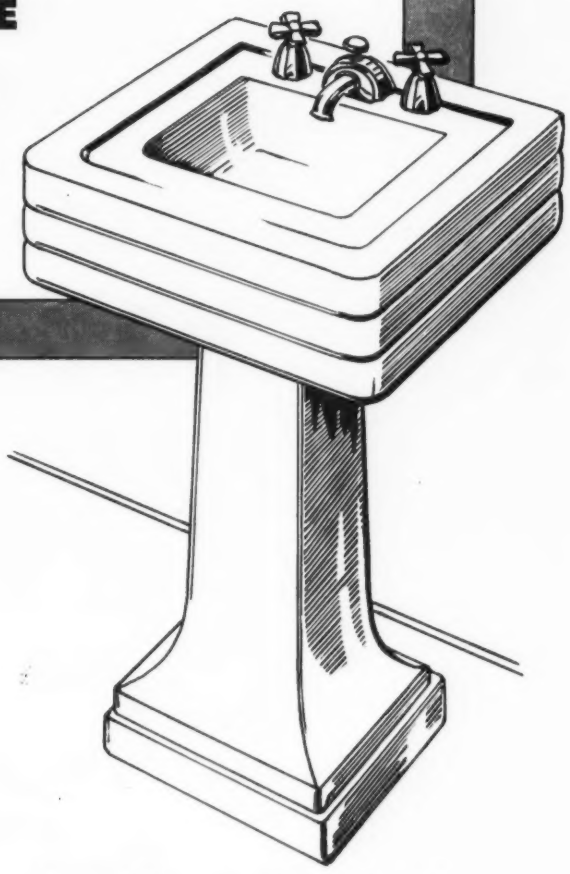

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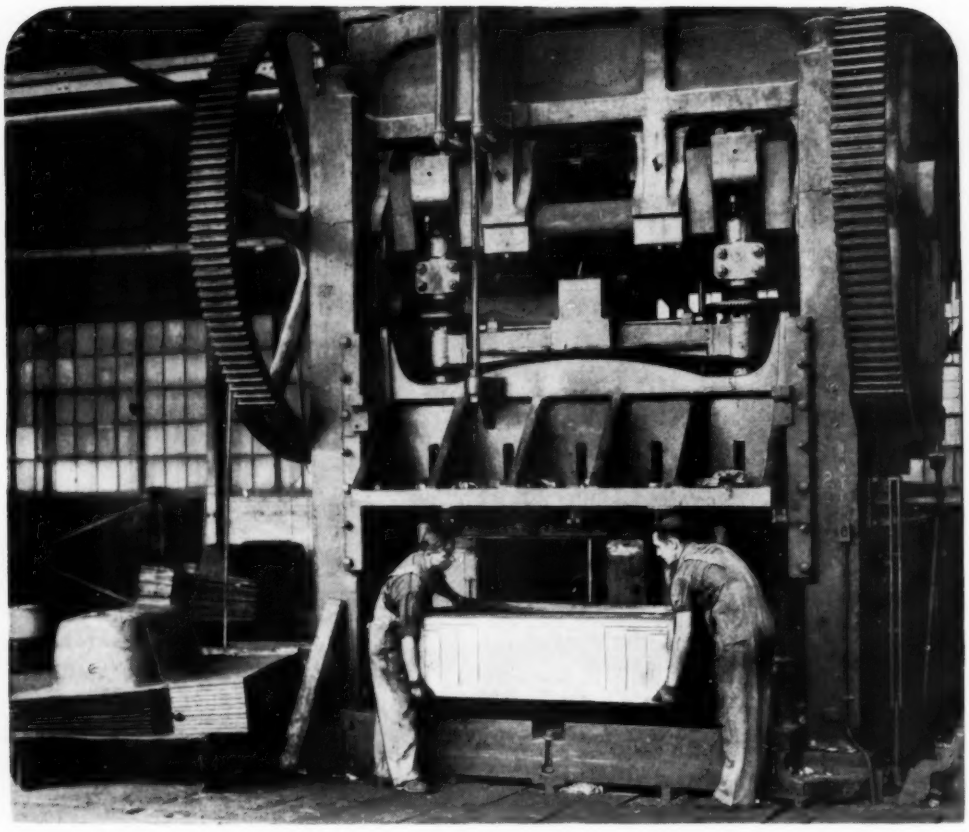

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THE Finish Line

INDUSTRY VOLUME MAY DOUBLE within the next year or two if the present plans of several well known companies are successfully culminated.

The great demand for postwar housing, plus new developments in porcelain enameled steel units, has brought plans to the forefront that would dwarf any pre-conceived ideas of enamel production. One plant in the South is said to be planning the installation of thirty-two continuous furnaces. A firm in Indiana has developed and patented a unit for facing ordinary cement block, designed for sale through building supply dealers. A Chicago company has plans for the production of a porcelain enameled, all-steel house in quantities up to 400 per day.

Estimated enamel consumption of these companies alone could be greater than the total peak production of all commercial frit manufacturers during their best year.

Nothing but the roughest of estimates have been procured on the requirements for steel, but this "rough estimate" of five tons per house could mean a requirement of 4,000 tons of steel per day for the two largest operations alone.

The Higgins home

Boat-builder Andrew Higgins is head of the southern project aimed at a production of 200 units per day, with a possible top of 400. While Higgins is a newcomer in the porcelain enamel field, it seems obvious that he will have the benefit of the best technical advice in the industry, as he considers it necessary.

The Indiana development of a salable unit free of "tailor made" requirements would seem to have a strong possibility for market expansion, but a time element will unquestionably be involved for market development.

The Lustron house

The Chicago development *(see "The Lustron house," page 47)* is backed by men who have a knowledge of both home building and porcelain enameling. The Hogenson brothers, two of the principals in the company, have had years of experience in both fields. The idea is not new with these men. Articles appeared in the early 30's by both William Hogenson and E. Hogenson on the possibilities of porcelain enamel for building construction, with the suggestion that ultimately it would be used for homes. This belief has been backed up in recent years by development work and the actual installation of architectural porcelain enamel for many commercial purposes.

The industry will bank on firms of this type, with strong industry interests, to keep the necessary high standards of quality in the finished homes to win the approval of ultimate home owners and the architectural profession.

The industry will be watching these projects with keen interest for, if they are successfully projected, it could mean the doubling of enameled steel requirements within the short period of a year or two.

The big question

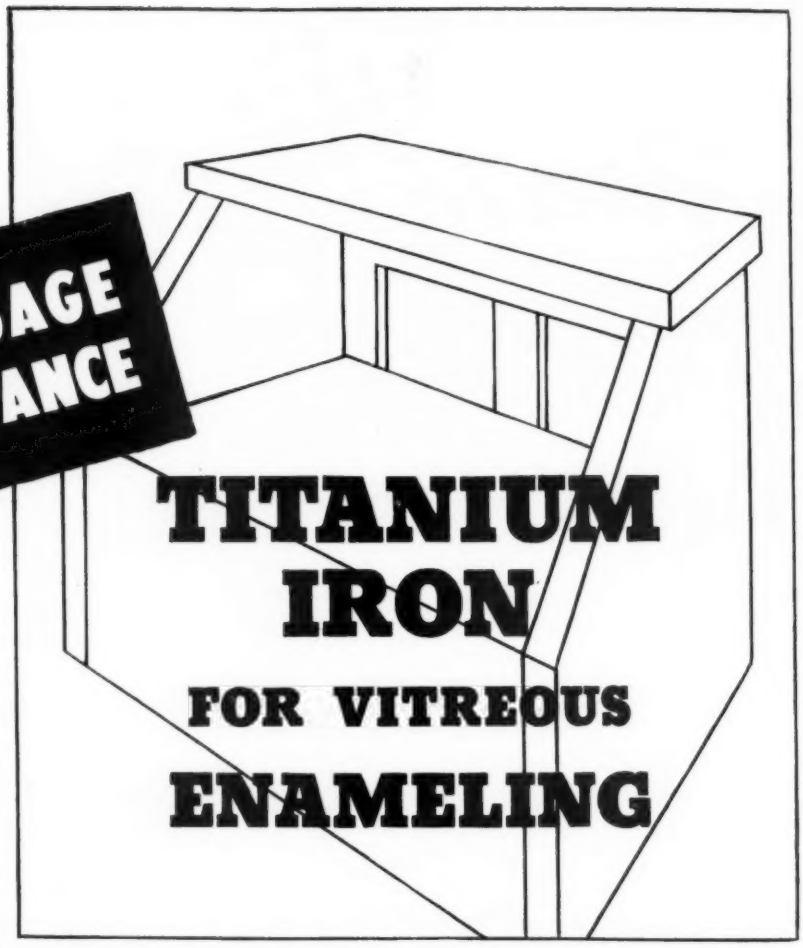
Judging from information received by *finish* from steel producers and raw material suppliers, the big question related to rapid expansion in our industry is still one of raw materials. Steel producers say that any improvement in the steel supply picture will have to be one of gradual improvement. It is reported that soda ash producers are reducing contracts for 1947 by 15%. Other important raw materials remain in tight supply.

If any one has the answer to this pertinent question, we shall be glad to give it prominent space in *finish*.

Dana Chase

EDITOR AND PUBLISHER

THINNER GAGE SAG RESISTANCE



TITANIUM IRON FOR VITREOUS ENAMELING

ENAMELED WARE of lighter gage stock can be fabricated to desired shapes and retain a better appearance because of the increased sag resistance of Titanium iron for vitreous enameling. This particular feature is clearly demonstrated on chart at right.

Another feature is the elimination of formerly necessary ground coats. For—under proper shop conditions—the cover coat can be applied directly to the base metal. Also, these thin finishes reduce the hazards of chipping and breaking. Furthermore, at enameling heats, there is no sign of enamel boiling. During three years of both research and production experience, no case of fish scaling has been reported.

Further information is available upon request.

EFFECT OF GAGE AND COMPOSITION ON SAGGING RESISTANCE

GAGE AND COMPOSITION	DEGREE OF SAG IN %
24 Ga. Standard Enameling Iron	100
24 Ga. Titanium Steel	57
18 Ga. Standard Enameling Iron	100
18 Ga. Titanium Steel	18

The Titanium Alloy Manufacturing Company produces the titanium alloy used in the manufacture of this steel. For samples of this steel, see your steel supplier. Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company, and The Titanium Alloy Manufacturing Company under trust agreement.

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Executive Offices: 111 Broadway, New York City *General Offices and Works:* Niagara Falls, N. Y.

High temperature ceramic coatings

research information on their war time development and suggested potential peace time uses

By D. G. Bennett • SPECIAL RESEARCH PROFESSOR, CERAMIC ENGINEERING, UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS

I • INTRODUCTION

An investigation of ceramic coatings to protect metals from the effects of high temperature was undertaken as a Project sponsored by the Power Plant Laboratory, of the Air Materiel Command, Wright Field, Dayton, Ohio. It was, and is being, carried on in the Department of Ceramic Engineering, University of Illinois, under the general supervision of the Engineering Experiment Station.

II • INVESTIGATION OBJECTIVES

The objectives were (1) the development of refractory coatings which, in thin layers, would strongly retard the oxidation of metal at high temperatures, and (2) the development of refractory coatings which, in thicker layers, would provide radiation suppression, radiation reflection, or thermal insulation in specific high temperature installations.

The original use for the thin, relatively glassy coatings was conceived to be the protection of metal surfaces from high temperature corrosion, principally oxidation. Effective coatings, it was thought, might permit the use of ordinary iron or mild steel instead of critically short alloy metals in airplane power systems.

Other desirable uses for such coatings arose as the investigation proceeded. One of these was the prevention of intergranular oxidation which sometimes causes the sudden stress failure of an apparently heat resisting alloy. Others were the damping of vibrations and the sealing off of incipient fatigue cracks in rapidly moving parts.

The thicker relatively crystalline radiation suppressive coatings, applied over a base coat and therefore called "top coats," were originally developed to suppress infrared radiations from heated metal since such

radiations could be picked up at a very considerable distance by enemy aircraft detection apparatus.

By proper use of such materials as diaspore, zirconia, Uverite, and magnesia held together by a relatively small amount of refractory, but high expansion bonding glass, coatings were developed which, in thicknesses of 0.012" to 0.015", would suppress up to 75% of the infrared radiations from heated steel. Somewhat later, the suppression of red or visible glow radiations became of importance in protecting aircraft from enemy detection. By the use of high temperature ceramic paints, visible glow from heated metal was reduced by over 90%. Here again, other uses for such coatings arose. By the simple expedient of introducing them between the metal and the source of heat their radiation suppressive, radiation reflecting, and thermal insulating properties combined to desirably reduce metal operating temperatures.

The implications for peace time utilization of such coatings are many. As the investigation progresses their protective range covers increasingly higher temperatures. It may be conservatively said that by the proper application of ceramic coatings most metals can be used at considerably higher temperatures than are practical for them in the uncoated state.

III • METALS

The compositions of the metals experimentally coated covered a wide range. It extended from ingot iron with less than 0.1% of impurities through low carbon, or mild steel, and included the various alloy steels containing large amounts of chromium and nickel. In some cases molybdenum, columbium, titanium, or other alloying elements were present. In other cases, the metal consisted almost entirely of the so-called alloying elements.

Ingot iron

Ingot iron is very desirable from a coating standpoint, but it has a tendency to embrittle upon extended heating. Figure I illustrates this condition.

Mild steel

As the percentage of carbon (and possibly Mn) increases the tendency toward embrittlement decreases. Figure II shows this decrease for 0.08C Steel. Figures III and IV show that with increasing carbon up to 0.21 per cent, embrittlement disappears.

Steel technologists agreed that embrittlement is caused by a "deficiency" of carbon in the metal. As long as any is present, oxygen prefers to react with it. Once the carbon is consumed, grain boundary oxidation occurs.

In actual coating development No. 1020 steel was subjected to long periods of extended heating at temperatures up to 1600° F. with no decrease in its ductility.

Alloy metals

This is an important group of metals inasmuch as many of its members are extensively used where resistance to high temperature is demanded. As a group, these metals do not embrittle. A few of them apparently do at certain critical operating temperatures somewhat lower than

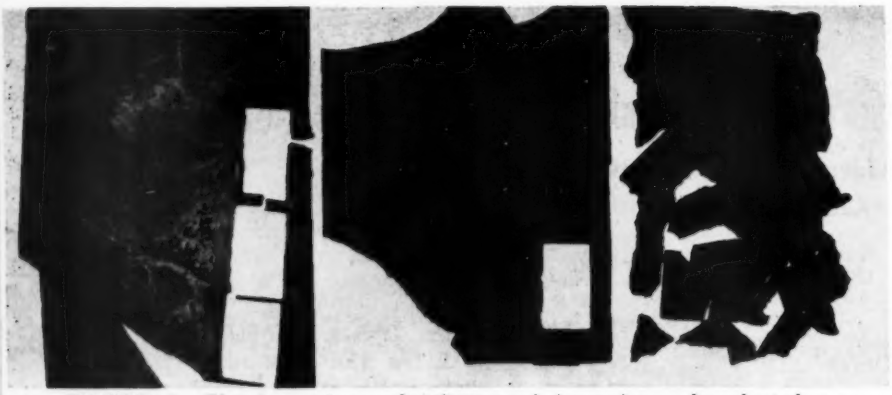


FIGURE I. *The increasing embrittlement of ingot iron when heated at 1600° F. in an electric furnace.*

FIGURE II. *Mild steel shows some embrittlement when heated at 1600° F. in an electric furnace.*

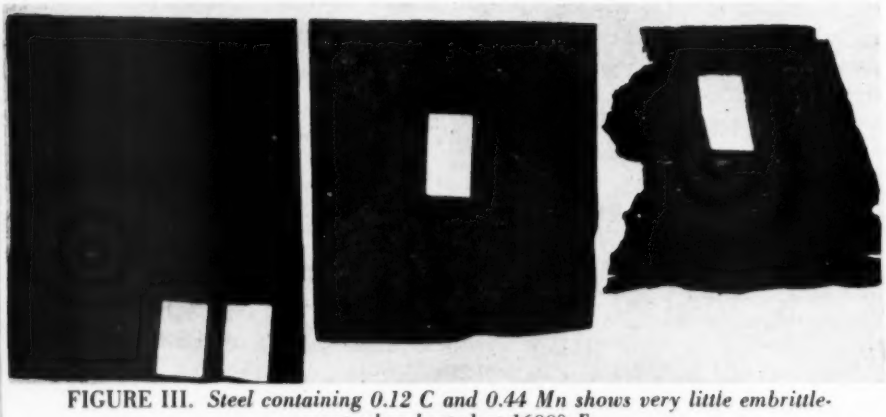
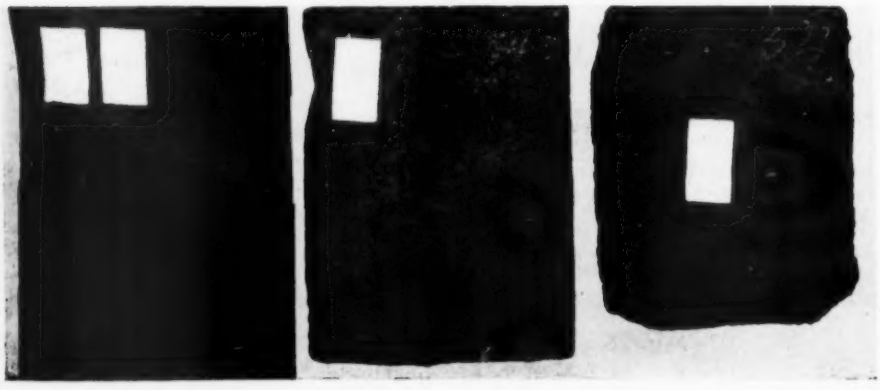


FIGURE III. *Steel containing 0.12 C and 0.44 Mn shows very little embrittlement when heated at 1600° F.*

FIGURE IV. *Steel containing 0.21 C and 0.44 Mn did not embrittle at 1600° F. in the tests.*



they can normally withstand. Due to their stability, and virtual absence of gas forming components, a ceramic coating of excellent continuity can be applied. Under suitable high temperature ceramic coatings, such metals are very slow to corrode. In one test a coated specimen of No. 316 alloy steel was heated for 450 hours at 1500° F. with apparently no change from the original coated condition. While it is true that many alloy metals in the uncoated condition will show excellent resistance to such temperature intervals, base coatings as described may be used to prevent or delay intergranular oxidation. The special, additional coatings may be used to protect the metal from considerably higher adjacent temperatures.

IV • COATING DEVELOPMENT

In the development of ceramic coatings for high temperature metal protection some well established trends in porcelain enamel practice are essentially reversed. More refractory oxides and higher maturing temperatures are necessary to produce coatings that will withstand intense heat for any length of time. Since parts for coating will often be of large size, adequate furnaces with high grade refractories must be adapted to process them. With either fuel or electric heating, the development of temperatures that approach the melting point of steel must be contemplated. In the search for effective coating materials, it is frequently necessary to consider those not now produced in quantity. Through all this runs the plain implication of increased coats. If, however, the life of a critical part in either a power system or a production unit can be greatly increased by coating, a considerable cost increase would be an excellent investment.

Coating materials

In the choice of base coating materials such fundamental properties as refractoriness, glass forming tendencies, adherence, elasticity, and low solubility for metal or its oxides must be carefully considered. Fluxes are usually at a minimum and refractories at a maximum in the formula-

tion of high temperature base coatings. Refractories, with rather high thermal expansion, must, therefore, be given careful study. Those considered for supplementing the outstanding glass forming oxide silica should offer workable ranges of thermal expansion, strength and elasticity. Those selected for trial should be thoroughly investigated in frit compositions while some of them may be used in large quantities as mill additions. Several refractory materials that merit consideration are alumina, beryllia, ceria, diaspore, zircon, and zirconia. In using large amounts of refractory material, rather unexpected eutectic points may sometimes be indicated.

In developing high softening point coatings of adequate thermal expansion, the so-called high temperature fluxes assume considerable importance.

The presence of small amounts of the adherence oxides is usually desirable, although several rather promising coatings were produced without them.

In cases where additional or "top" coats are to be developed for control of radiant energy, the fundamental

FIGURE VI. *A 1020 steel cylinder coated inside with a resistant ceramic coating after long heating at 1500° F. The unprotected outside metal has almost all oxidized.*

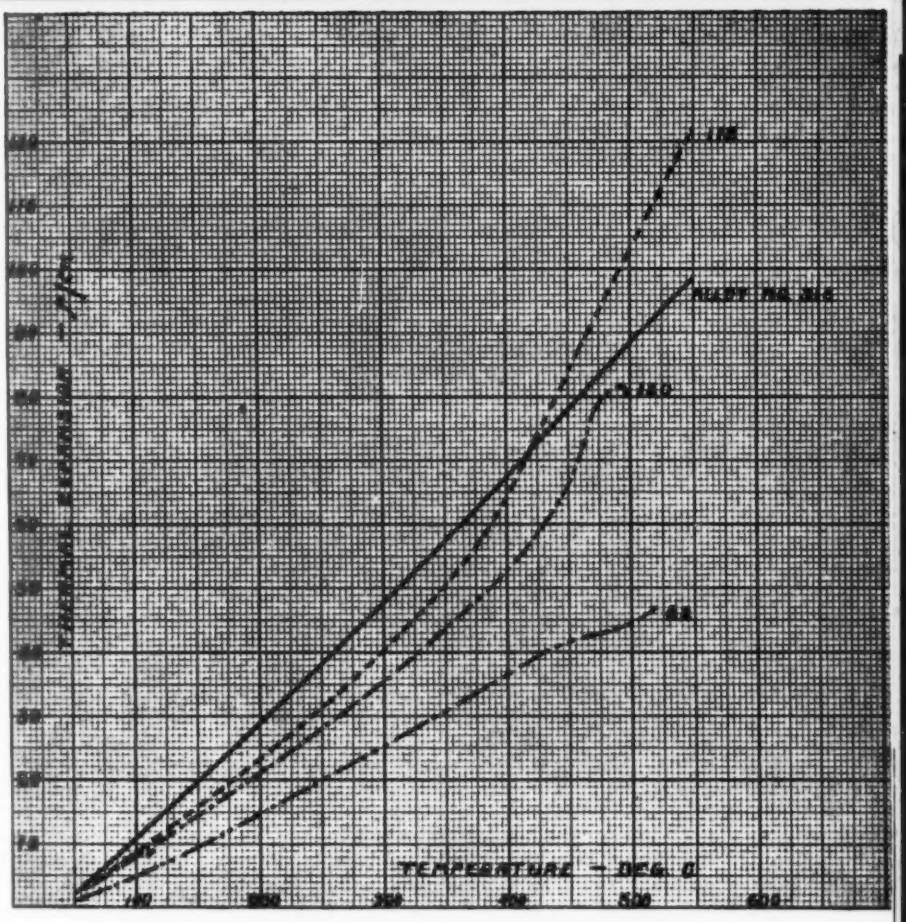


FIGURE V. *Interferometer Measurements*

Thermal expansion curves found for (1) No. 316 alloy metal, (2) two top coat bonding frits, Nos. 118 and 120, and (3) base coat frit No. 62.

FIGURE VII. *The aviation fuel torch unit in operation. A ceramic coated metal cylinder on test.*

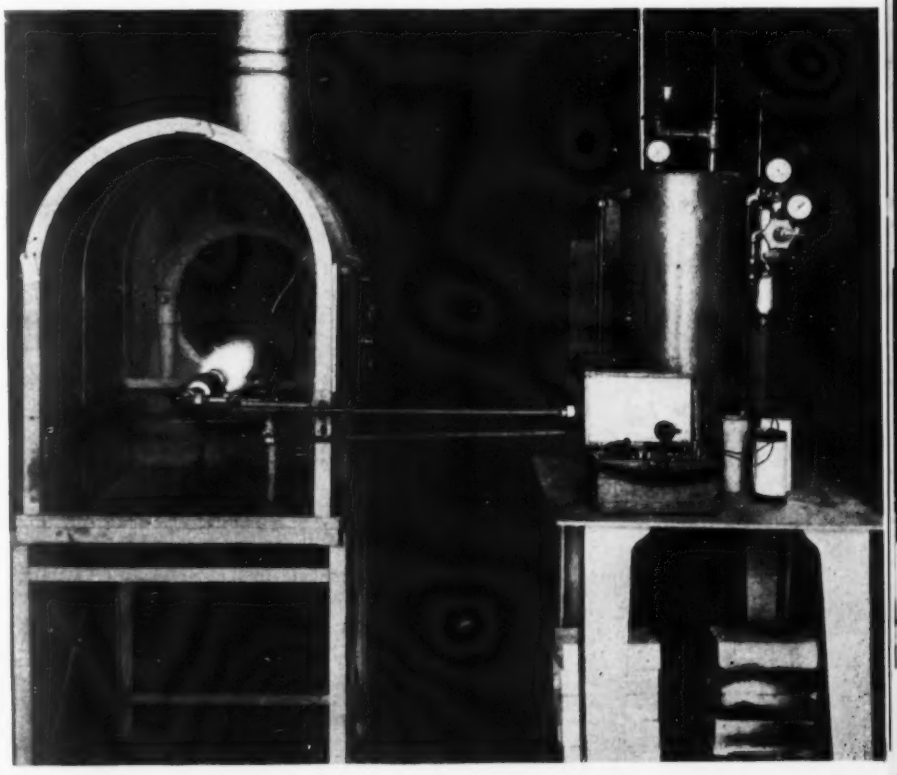


FIGURE VIII. *A close-up view of a coated metal cylinder on test. Radiation suppressive top coat is brushed away over central area.*

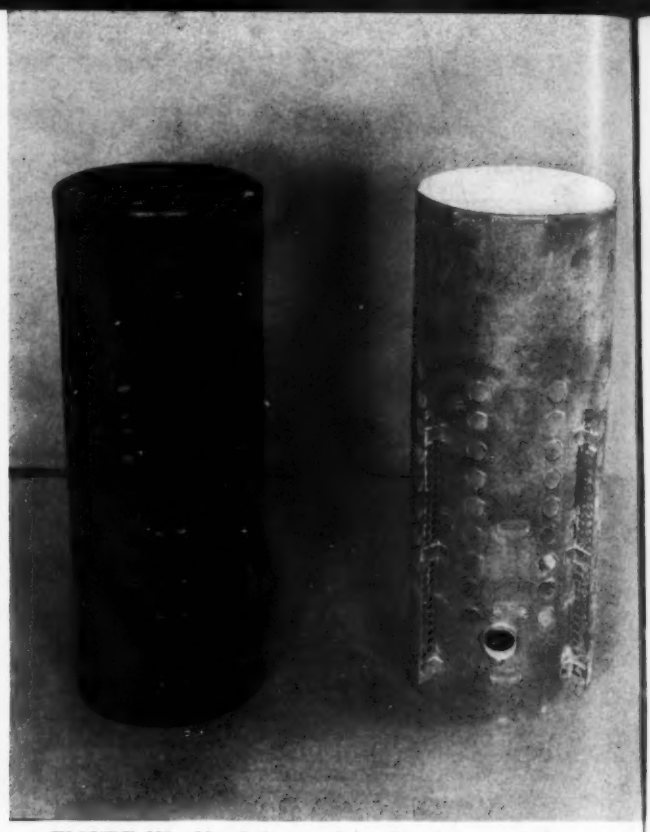


FIGURE IX. *Metal flame tubes. One in ceramic base coat, inside and outside; the other with base and top coat on inside only.*

emissive properties of the principal components are of first importance.

Coating preparation

In the preparation of high temperature base coatings, many conventional practices are followed. A number of less common problems will be presented here.

Smelting — In smelting some compositions, it was found that the time honored range in which a smooth pliable thread could be drawn was quite narrow. Upon continued smelting, the molten batch would quickly develop a viscous crystalline phase.

Refractory mill additions — It was not sufficient to so proportion such additions as to obtain an initially acceptable coating. The rate of solution of refractory grains during extended heating and the resultant effect upon coating expansion were important considerations.

Variable metal expansion — A very considerable range of thermal expansion exists between low carbon steel and the alloy metals group. Even within the alloy group, expansions vary greatly. For this reason it was necessary to develop not one, but a series of temperature resistant coatings. In this work the interferometer was regularly used to establish expansion coefficients for frits and coatings. In some cases, where satisfactory data were not available, the metals themselves were thus investigated. Figure V shows the expansion curves for several frits and that for No. 316 alloy steel. Its coefficient was found to be 584 x 10^{-7}. It may be noted from the figure that but one of the three frits presented could be expected to fit this metal.

Rate of oxide formation — It is generally accepted that a certain amount of metal oxide, formed on the metal surface, is necessary to promote good coating bond. It is perhaps as well known that an amount very much below or above some optimum is undesirable, but it may be that this problem is not always given the consideration it deserves. A case in point was the coating of alloy steels. Such steels are not thought to oxidize to any considerable extent at coating temperatures, yet the puzzling fact was noted that sometimes a coating with strong adherence to one alloy would adhere very poorly to another. Some other coating might exactly reverse the situation. A careful study of the oxidation rates of a number of alloy steels revealed that one of them might have an oxidation rate several times greater than that of another. With the benefit of this information, it was possible to formulate or select coatings, for a given alloy, that would fuse at an opportune time for retarding further oxide formation.

V • TEST METHODS

In this general discussion, it is not intended to go deeply into the technique of testing. The coatings must first mature to give a continuous protective plan. They must adhere to the metal. They must, in some cases, withstand thermal shock such as is produced by spraying water on the red hot specimen or by plunging it into cold water a predetermined number of times. Above all, they must withstand many hours of heating under both oxidizing and reducing conditions. Temperatures used in such tests range from 1500° to 2000° F.

A useful electrical resistance meth-

od for studying the sustained protective properties of base coatings was developed. The radiation suppressive properties of "top coatings" are quantitatively compared by means of a caesium photocell and sensitive galvanometer appropriately assembled. In routine preliminary tests, some specimens are heated in an electric furnace with periodic withdrawals for inspection and to subject them to the thermal shock of repeated heating and cooling. Other specimens in the form of coated cylinders, are either heated in a torch unit using aviation fuel or on a high pressure natural gas torch stand in which oxygen can be introduced into the air line as desired.

Several illustrations are presented. Figure VI shows a mild steel cylinder, carrying a ceramic coating on the inside but none on the outside, after long heating at 1500° F. in an electric furnace. The metal, except that immediately protected by the coating, has almost all oxidized to thick brittle flakes. The coating remains as applied.

Figure VII shows the aviation fuel torch unit in operation. In Figure VIII a mild steel cylinder coated on the outside with one of the early top coats, which has been brushed away to the base coat in the center, is shown in a close-up view.

IV • CERAMIC COATING APPLICATIONS

Many uses for high temperature resistant ceramic coatings can be visualized. In general, it may be said that with them steel and iron can be made to function effectively at temperatures well above those they will withstand in the uncoated state. Among specific applications that might be considered are those to flame tubes, turbine buckets, exhaust stacks, or collector rings, space heaters, smoke pipes, super heated steam pipes, and the annealing covers frequently used in heat treating metal.

Figure IX shows two flame tubes, one in ceramic base coat while the other carries an additional top coat on the inside. In tests of these tubes, the coating eventually flaked off due to the warping and buckling of the

to Page 50 →

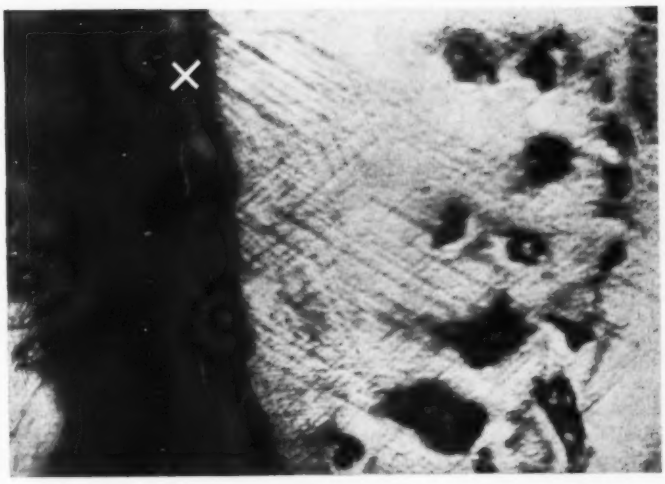
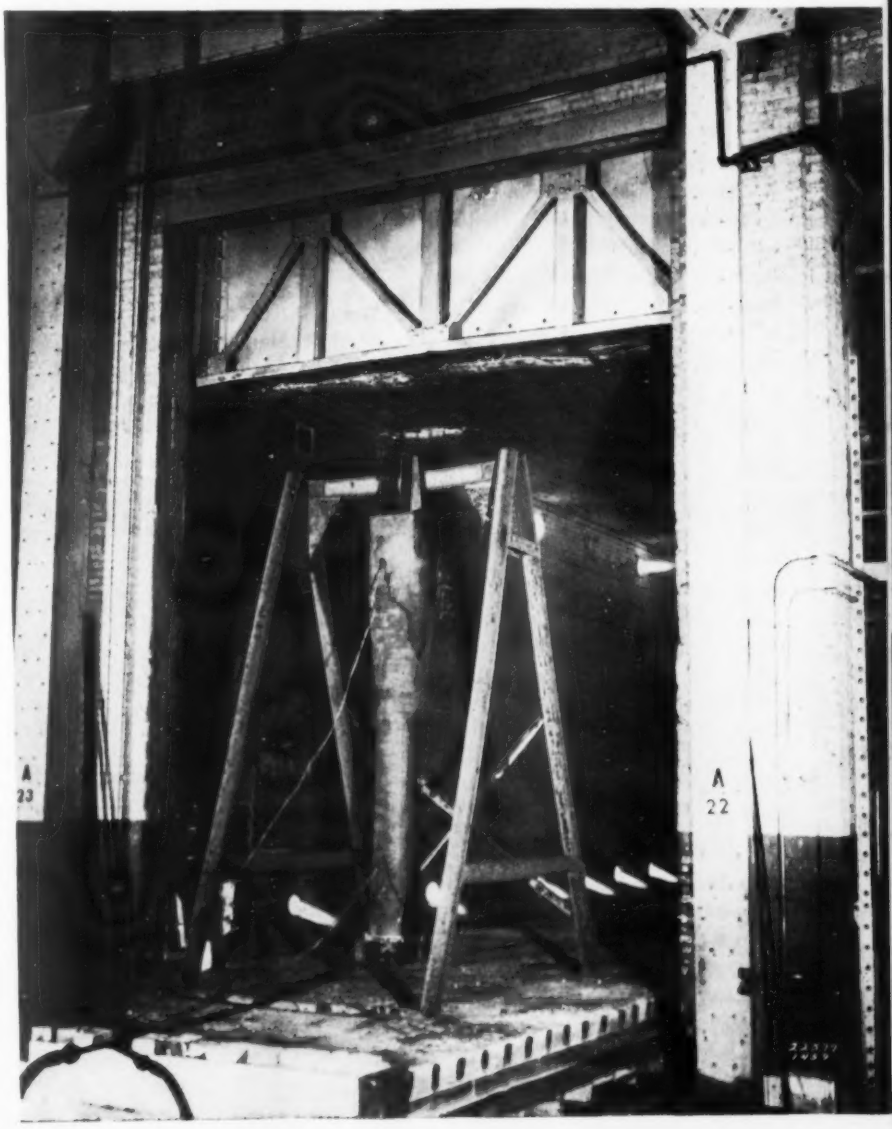


FIGURE X. *Photomicrograph (500X) of coated turbine bucket section after 227½ hours of operation. ½ mil of coating remains (at X).*

FIGURE XI. *A flame tube eleven feet long suspended for firing after inside application of high temperature ceramic coatings.*



Production and enameling problems with non-enameling iron

some of the answers to a current problem in porcelain enameling plants

By D. S. Beal • THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO

IT IS a well established fact that there is not enough enameling iron to go around, which makes it necessary in many cases to use cold rolled, hot rolled and even high tensile sheets for enameling. This is an undesirable way of operating but, rather than shut down, practically all enamel plants are enameling some sheets which are not of enameling quality. It is difficult to estimate when this condition will correct itself. It has been brought about, I believe, principally by the fact that the enamel iron demand has doubled, or even tripled, over what it was in prewar years and steel making capacity has expanded little.

Increasing the production of enamel iron in a mill does not depend on managements deciding to schedule enamel iron instead of low carbon steel, but rather depends on normalizing capacity. Since all enamel iron is normalized to refine the grain structure and this operation requires special furnaces, to increase enamel iron production it would first be necessary to construct new normalizing furnaces.

In times like these it is natural that each department is trying to get what it feels to be its fair share of total production. I can report only on my company's operations but we are producing as much enamel iron as before the war. This keeps all our normalizing equipment busy and, since other industries are also badly in need of sheets, the installation of additional equipment for the production of larger quantities of enamel iron seems doubtful.

New developments in enameling iron production

However, there are developments in progress on an enameling sheet which may make normalizing of the sheet unnecessary. If further work shows this to be true and normalizing is not required, it is possible that this new sheet may be produced in very sizable quantities.

From the operating standpoint, enamel iron is not particularly desirable for several reasons. One is that it takes longer in the open hearth at a higher temperature to make a heat of ingot iron. The added time will vary from 4 to 6 hours and is due to the fact that it takes that much longer to reduce the carbon and manganese and reach the final analysis. The longer time and higher temperatures result in much greater wear on the furnace bottom and sides than would be the case if a higher carbon steel were being made. There is also a critical rolling temperature both in the blooming and hot strip mill which makes enamel iron more difficult to roll.

The problem of impurities in non-enameling iron

Since such a large quantity of low carbon cold rolled sheets are being used for enameling, the mills are trying to supply a sheet which will cause as little trouble as possible but it is doubtful if low carbon sheets will ever be the equal of enameling iron, due to the fact that there are more materials present which, to the enameler, are impurities. It is surprising how well cold rolled low carbon steel has worked in some instances, but the uniformity of the enameling qualities can not be guaranteed since the product is not enamel iron and was originally designed for some other purpose.

The principal difference in chemistry of enamel iron and low carbon sheets is in the amounts of carbon and manganese present.

A typical enamel iron analysis might be: C,.03; Mn, under .10; P,.01 max.; S, .03 max.; Cu, .08 max.; Tin, .01 max.; and Ni, .08 max.

While a low carbon might show: C, .08 max.; Mn, .30-.40; P, .01 max.; S, .03 max.; Cu, .08 max.; Tin, .01 max.; and Ni, .08 max.

The two most common troubles encountered in enameling non-enam-

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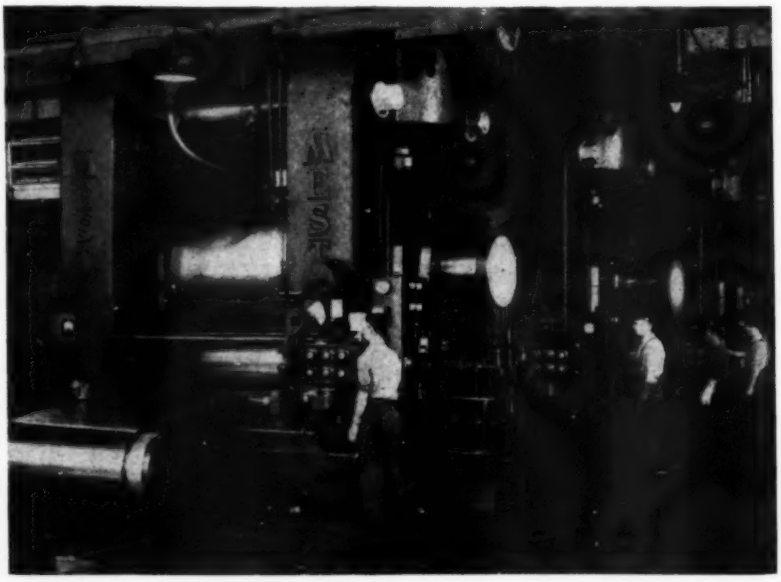


Automatic cleaning and pickling
prior to porcelain enameling

a discussion on manual and automatic equipment, materials, and processes

By Leroy Camel • DETREX CORPORATION, DETROIT, MICHIGAN

WITHOUT question, there is no part of the metal fabrication industry that is more exacting or requires as thorough cleaning as does the enameling division. Improperly, or poorly cleaned work is the direct cause in the majority of instances where reject costs are excessive.

Rejects, after enameling, present in most cases a major loss, as the reclamation of a part at this stage of manufacture costs as much as the original application of the finish. Therefore, cleaning can be considered of prime importance to successful, economical enameling.

For years it has been the goal of cleaning engineers to develop and perfect the universal cleaner — one that would remove all of the many and varied compounds and oil lubricants adhering to metal after traveling a fabrication cycle — one that would clean quickly and thoroughly, without requiring excessive heat and that could be purchased at a low cost. That particular cleaner has not yet been developed and is not likely to be, any more than a standard die lubricant will be used for all metals regardless of section.

An operator in the enameling industry may be confronted with the problem of removing several types of soil in the preparation of metal prior to the final finishing. Among the more tenacious are the drawing compounds, drawing oils, surface oxides and welding scales.

Drawing compounds present the greatest problem

The removal of drawing compounds alone is a complex problem, inasmuch as many of the compounds used contain metallic soaps as well as pigments which will vary in content from lead to calcium. While these ingredients are essential for the protection and lubrication of the stamping dies, they add considerably to the cleaning difficulties. It is this type of tenacious soil that has presented the greatest problem to the manufacturers of cleaning compounds. Where it has been possible to eliminate the use of drawing compounds in lieu of drawing and stamping oils, the cleaning operation has been very much simplified.

Editor's Note:

Much space in current issues of *finish* is being devoted to the subject of metal preparation for two very definite reasons. First, enamelers throughout the country are showing greater interest in this subject than in any other which comes within the scope of our editorial policy. Second, there is every indication that at last the "pickle room" is to graduate from the darkest corner of the porcelain enameling plant to its rightful place on the plant production line. We feel that anything *finish* can do to assist in this movement is in the interest of industry progress.

Surface oxides of metal must also be removed thoroughly before the subsequent finishing operation. This again is a specific problem subject to individual analysis and accomplished through the use of various types of acid pickling treatment.

The generally accepted processing layout prior to finishing, which is most familiar to all of us, consists of two heavy-duty cleaning tanks, a rinse tank or possibly two rinse tanks, acid pickling and neutralizing baths. All of this equipment is, as a rule, relegated to the back room of the shop because of the many unfavorable conditions which normally exist in open-tank type cleaning operations.

All too well is the operator acquainted with the hardships and failure to produce satisfactorily cleaned and pickled surfaces in the preparation for final finishing. In many instances, the almost universally accepted alkaline-type cleaning baths are being used for the removal of many varied types of soils. Too often parts have emerged from these hand-operated cleaning tanks thoroughly clean as far as oil and grease removal is concerned, but still showing an adherent coating of pigment, a residue remaining from the drawing or stamping compound used.

Not all of these pigmented compounds are soluble in normal pickling acid, and changes of acids which affect the economy of operation are often made before complete removal is accomplished. At this point it is well to consider the removal by chemical means of intentional dirt encountered in the enameling industry.

Methods for complete removal of intentional dirt

Today, there are three distinct methods, or combinations of equipment and materials, available to the metal working industries for the complete removal of intentional dirt, or the soil picked up in the process of manufacture or fabrication.

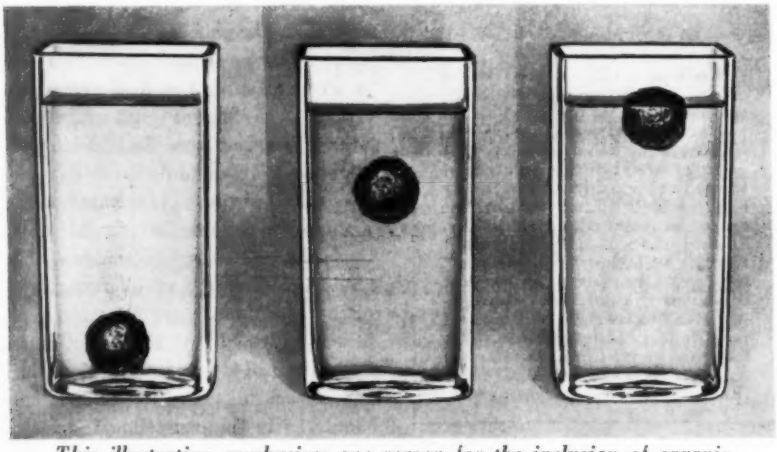
1. Solvent vapor degreasing by the use of chlorinated hydrocarbons.

2. Water-emulsion cleaners, either in still tanks or automatic parts washers.

3. Alkali cleaning compounds, either in still tanks, automatic parts washers, or used electrolytically.

When considering the removal of the various pigmented compounds, it is well to bear in mind that although the use of high temperatures have a tendency to speed the removal of the oils and greases, they also will set-up the pigment to such an extent that its complete removal is practically im-

Drawing compounds present an important problem in the cleaning process.



This illustration emphasizes one reason for the inclusion of organic wetting agents in a scientifically compounded cleaner.

A simple demonstration of solvent degreasing. A wrench which has been coated with oil is subjected to the vapor of a degreaser. Note the oil dissolving in the vapor.

possible without the use of specialized acid pickling.

The use of solvent-vapor degreasing, wherever possible, is advantageous. Trichlorethylene, generally accepted in the majority of installations as standard, has a low boiling point. Chlorinated solvents requiring high operating temperatures do have a tendency to set-up the pigments and could greatly retard the removal of drawing and stamping compounds.

Emulsion cleaning materials are a comparatively recent development and are now used extensively in many cleaning installations, especially for the removal of tenacious oils and compounds.

Since the development of emulsion for metal cleaning, particularly for the wetting-out of insoluble drawing compounds, former difficult cleaning operations have been successfully accomplished both in still hand-tank operated equipment and in mechanical parts washers. Where emulsions are intended for use in hand-operated still tanks, development has extended to a two-phase emulsion, in which the second phase or solvent layer acts as a reservoir or safety factor. This layer can be visually controlled to maintain a sufficient free solvent layer on the surface of the cleaning tank.

For any work being lowered through the solvent layer, preferential wetting is extended to the soil and final wetting is more rapidly accomplished in the water-emulsion content comprising the major portion of the solution in the tank.

This type of application permits the use of temperatures far below the normal operating temperatures used in alkaline cleaning. Again, let me emphasize that the use of materials requiring high operating temperatures can be, and usually are, detrimental to the success of the cleaning operation.

The treatment of soiled parts in emulsion is always followed by alkaline cleaning. Here again, in most instances, it has been found that rather than maintain a rolling boil, temperatures of 160 to 170 degrees Fahrenheit, with mechanical agitation for shorter periods, produce exceptionally clean metal surfaces.

Emulsions, compounded for use in mechanical spray-washing equipment, are not of the two-phase or solvent-reservoir type. These materials are completely soluble in water which may be controlled by simple titration.

Other features of the emulsion materials include rust protection during an interrupted flow of production and the absence of fire hazard. Emulsions in solution at workable concentrations have no measurable flash point and consequently eliminate the fire hazard, either in open tank or spray equipment operation.

The industry is thoroughly acquainted with the term "alkali cleaning." However, reviewing the requisites of good alkaline cleaning practice, consider the properties an alkali cleaning compound must possess to meet the requirements of cleaning prior to any high quality finishing.

Solvent degreasing

The use of solvent vapor degreasing has many applications in the enameling industry that will reduce cleaning time and lower the overall cleaning cost. Degreasers, like any other purchased equipment, must fit the requirements of the product and the production schedule. Various sizes, both hand operated and conveyorized, are available to suit practically any requirement.

Mechanized equipment, in lieu of open tanks, is the Utopia of production enameling today. Mechanical washing equipment might well be described as a method of expediting the action of cleaning solutions by recirculation through pumps, spray headers and nozzles at a definite predetermined pressure according to the requirements specified.

Parts to be cleaned may be carried or conveyed through mechanical washing equipment by crossrods, mesh belts or by monorail.

The monorail type of conveying equipment probably is more readily adapted to production lines where uniform parts are being processed.

Although the successful application of mechanical washing equipment to cleaning problems in any industry rests in part on a thorough knowledge

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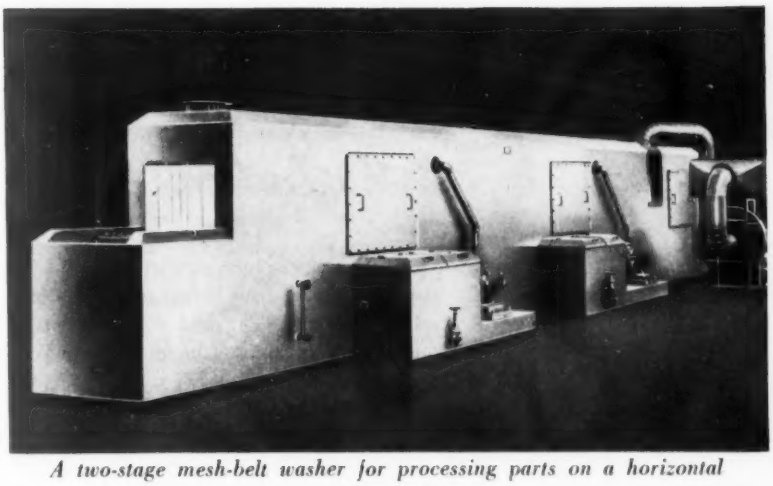
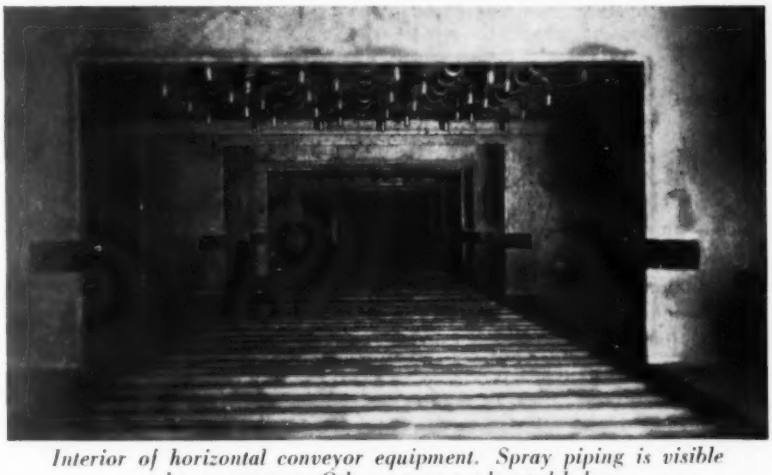


A two-stage mesh-belt washer for processing parts on a horizontal conveyor.



Interior of horizontal conveyor equipment. Spray piping is visible above conveyor. Other sprays are located below.

A mechanized unit of this type with monorail conveyor may readily be designed to include cleaning, pickling, nickel solution, neutralizing and dry-off.

Temperature control of enameling furnaces

fifth of a series of six detailed articles on drying and firing procedure

By Professor A. I Andrews • ASSOCIATE EDITOR

TEMPERATURE control of enameling furnaces is generally accomplished through the use of thermocouples. The thermocouple is an electrical instrument made up of two dissimilar metal wires. If these wires are joined by welding at one end we have what is called the hot junction or the point at which temperature is measured. By insulating the wires from each other and keeping the loose ends in a cooler place, an electrical potential is instantly set up between the two wires, the magnitude of which depends upon the difference in temperature between the hot junction and the cooler ends which are called the cold junction. This electrical potential (EMF) is caused by two phenomena: the Thompson effect, which depends upon the different temperatures in different parts of the same wire, and the Peltier effect, which depends upon the EMF set up at the junction of two dissimilar materials. For practical purposes the important consideration is that the EMF of a thermocouple depends upon the difference between the temperature of the hot junction and the cold junction.

In most thermocouple installations the thermocouple itself extends only through the wall of the furnace, and extension leads, which are made of less costly alloys than those used in the thermocouple, are utilized to extend the cold junction to a constant temperature box or to the instrument. Instruments are generally compensated for temperature changes so that the effect of a constant cold junction temperature is realized at the instrument. As the temperature of the hot junction then varies, the EMF varies and, once the thermocouple is calibrated, the temperatures of the hot junction can be read directly on the galvanometer or potentiometer.

Although thermocouples when properly installed and operated are very accurate in their measurement of temperature, many errors may creep into their use. The first consideration is the location of the hot junction of the thermocouple. It is generally protected by a porcelain and refractory tube. The temperature measured by a thermocouple is the temperature of the hot junction, and there is no averaging out of the temperature in a large area. The hot junction should, therefore, be placed as near as possible to the ware which is being fired. In any case it should always be kept in exactly the same position in the furnace. If not inserted the same distance each time it is replaced, if a different kind of protection tube is used or the end of the tube is broken off, the indicated temperatures will be different. Thermocouples should be inspected frequently and serviced; otherwise, errors may develop due to deterioration, slagging, movement, or shorts in the line. It is good practice to check the thermocouple itself against a known standard or, as in the use of base metal thermocouples, replace the old one with a new one at regular intervals. The temperatures of the leads, the lengths, and other factors which affect electrical resistance in the line have some effects on the flow of electrical energy, but with high resistance galvanometers or potentiometers this is not an important consideration.

Types of thermocouples

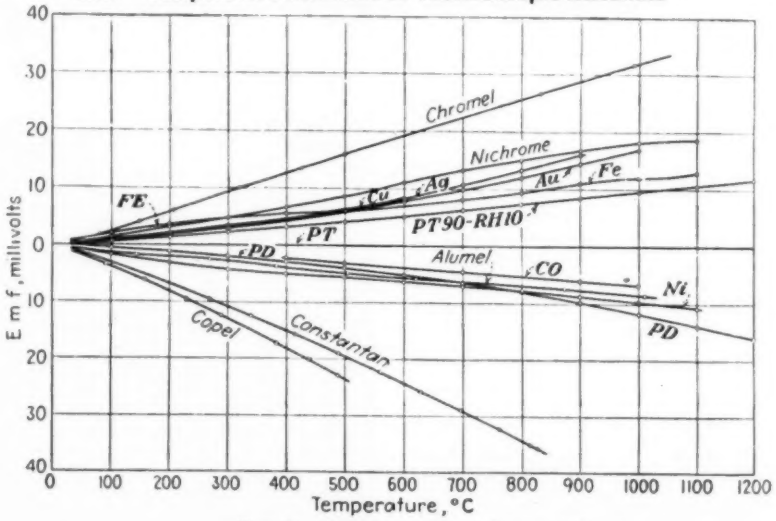
There are many different types of thermocouples and each has its own EMF-temperature relation and its own set of extension leads. The latter must be used only with the type of thermocouple for which they are designed and the positive and negative wires must not be interchanged. Two types of thermocouples are most common in the enamel industry: — the noble metal, platinum — platimum 10% rhodium; and the chromel-alumel, base metal couple.

Figure I shows the EMF temperature relations of various thermocouple metals and alloys.

The chromel - alumel couple is satisfactory for continuous use up to 2000° Fahrenheit. The platinum-

Figure I.

EMF — Temperature Relations of Thermocouple Materials (7)



E.m.fs. of various materials vs. platinum.

platinum 10% rhodium thermocouple can be used up to temperatures of 2700° F. At higher temperatures, the deterioration of thermocouples becomes rapid and results are not dependable.

Calibration

Figure II shows an arrangement for calibrating a thermocouple against a standard. As the temperature of the furnace rises, readings can be made on first the standard and then the test couple by means of manipulating the single pole double throw switch.

Base metal thermocouples do not generally receive servicing as it is generally more convenient to replace them. The whole system, however, should be checked from time to time with an optical or radiation pyrometer. The temperature reading with these instruments and the thermocouple will probably not be exactly the same as one can not, under furnace conditions, measure the temperature of the identical area as that measured by the thermocouple. The readings should, however, be relative. Another method of checking is sometimes possible when a standard thermocouple can be inserted alongside of the service couple in the furnace and temperatures are taken on a portable set made up of a standard couple, leads, and a high resistance galvanometer. In some cases a regular test set is used to measure line resistance and detect shorts.

Figure II [8]

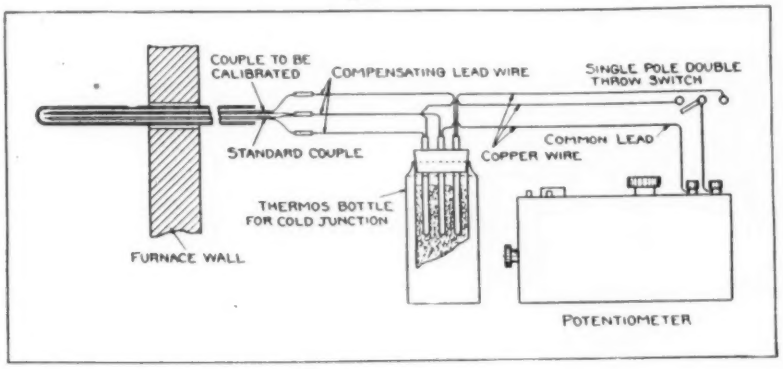


Figure III.
Equipment for Homogeneity Test

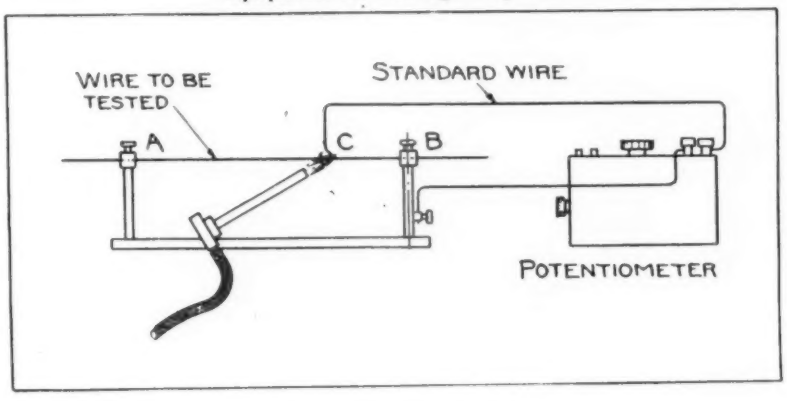
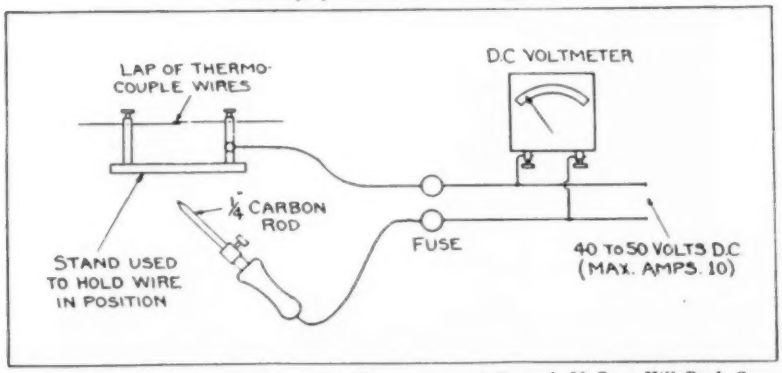


Figure IV.
Test Equipment for Welding [8]



(7) Rhodes, Industrial Instruments for Measurement of Control, McGraw-Hill Book Company, Inc., New York. (8) R. S. Bradley, American Refractories Institute, Tech. Bul. No. 39.

Homogeneity

Noble metal thermocouples, because of their cost, should be serviced and repaired. Figure III shows a method for determining the homogeneity of a thermocouple wire. The test wire is connected between binding posts and a loop of a like wire is moved along the test wire at the same time as the junction is heated by a bunsen burner. The galvanometer on the potentiometer should show no deflection. Parts of the test wire showing deflection of over two points on the galvanometer should be cut out and scrapped.

Welding

The wire can be lap welded together, after pieces are cut out, by using the equipment shown in Figure III. The ends of the wire are lapped about 1/32 of an inch. With the wires connected to one terminal of a 40 to 50 volt source delivering five to eight amperes, the carbon tip is used to strike an arc at the lap just for sufficient time to fuse the two wires together. An oxy-gas or an oxy-acetylene welding torch with a No. 1 tip can be used for the welding. The oxy-gas flame is easier to control because of the lower flame temperature.

The junction of the two wires of a thermocouple can be joined in a similar manner. Borax is used as a

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QUICK TRIPS TO ENAMELING PLANTS

A visit to Lawndale Enameling Company

LAWNDALE Enameling Company is a good place to visit around lunch time. The plant, one of the industry's newer jobbing facilities, is located near the market district in Chicago, and nearby restaurants feature "fresh" food of all kinds.

Early this year, Art Lander, formerly enamel technician at Cribben and Sexton Company, and two of his co-workers, Leonard Lodestro, control man, and Elden Keane, furnace man, together with Walter Keane, a Stewart-Warner die man, decided to start a new plant in Chicago to take care of a ready market for enameling services. These men broke a speed record for equipping a plant by getting all equipment lined up, installed, and putting the plant in operation within a sixty-day period. They found pickling tanks in Kokomo, Indiana, and other equipment in various corners of Chicago and other nearby towns.

This one-furnace (box type) plant started operations March 1. Included in the auxiliary equipment are four mills — 25, 100, 200 and 500 lb. capacities — and two spray booths, 10′ and 4′.

Once set up, the company went out after business with the idea of delivering the plant's capacity in quality work — *and promptly*. At the time of our recent visit the plant had been in operation eight months on a 7-day week basis, 24 hours a day.

We saw an interesting variety of work on the floor at the time of our visit. It included reflectors for gasoline stations, pasteurizer pails, water filter units, signs, table tops, washing machine tubs, cast iron cable supports, some architectural parts and chimneys for prefabricated houses.

All of the principals are active in the operation of the plant and, as a result, "labor problems" are of little consequence. Even with the 24-hour days and the 7-day weeks, the men squeeze out sufficient time for keeping in touch with their hobbies. Art Lander says his include fishing and *enameling*. The Keane brothers are softball and horseshoe enthusiasts, and Leonard Lodestro is active in Boy Scout work.

Left: Art Lander, company general manager, photographed in his office.

Follow finish *for more quick trip reports on enameling plants.*

Spraying table leaves in the Lawndale plant.

Leonard Lodestro and Elden Keane inspect a reflector in production.

"A slide film" presentation

of research data on porcelain enamel preferences

results of three recent surveys conducted by the Market Research Committee of the Porcelain Enamel Institute

1. a consumer panel survey conducted by American Home magazine
2. a mail survey to a representative list of architects
3. a mail survey to a representative list of product designers

A THREE-WAY market survey among architects, product designers and ultimate consumers has been completed by the Market Research Committee of the Porcelain Enamel Institute, and was presented in slide film form as a report before the P.E.I. annual meeting on October 24.

The survey was conducted under the supervision of the Market Research Committee's chairman, Robert J. Ritchey, manager of Market Development, Carnegie-Illinois Steel Corporation. The report, in the form of a pictorial slide film, was accompanied by a running commentary given by Floyd C. Woleslagle, a member of the committee.

On the following pages *finish* presents a special adaptation of the slide film and a running commentary developed by *finish* from the committee report and survey data.

Part I tells about the ultimate consumer preference for finishes on kitchen equipment. Consumers expressed the greatest preference for porcelain enamel over other finishes for refrigerator interiors and exteriors, kitchen tables, sink drainboards, sinks, frozen food cabinet interiors and exteriors, ranges, washing machine tubs and washing machine exteriors.

Part II reveals the architects' and designers' opinions about the application of porcelain enamel. The architects' survey showed that 70% of the architects reporting planned to use porcelain enamel for new projects they are designing, and 66% plan to use it in modernization or remodeled jobs.

The chief reasons given for their preference were porcelain enamel's durability, low cost, wide color range, attractive appearance and cleanliness. Also rated as important were the product's ease of application, low maintenance expense and flexibility of design.

Market Research Committee

R. J. Ritchey, Chairman, Carnegie-Illinois Steel Corporation

G. S. Blome, Vice Chairman, Baltimore Porcelain Steel Corp.

B. F. Birdwell, Porcelain Metals Corporation

J. F. Ingram, Ingram-Richardson Manufacturing Company

Edward Mackasek, Porcelain Enamel Institute, Inc.

F. L. Meacham, Chicago Vitreous Enamel Products Company

P. J. Sandmaier, Republic Steel Corporation

N. G. Wedemeyer, Rohm & Haas Company

F. C. Woleslagle, Carnegie-Illinois Steel Corporation

In the survey of product designers, 22% indicated they plan to use porcelain enamel for new products they are designing or developing. This is considered by the PEI to be a tremendously important forecast for porcelain enamelers, since the group surveyed included designers of all types of products. It is indicated that porcelain enamel will be specified for over 100 different products and applications.

Major emphasis was placed by the design group on porcelain enamel's attractive appearance and durability. Designers also based their preference on the product's low cost, cleanliness and sanitation, corrosion resistance, acid resistance and resistance to heat.

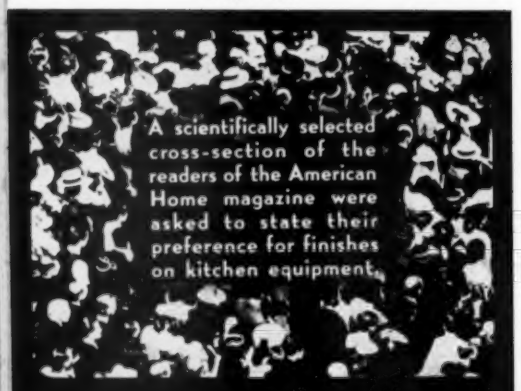
From the architects reporting that they are *not using* porcelain enamel came a number of reasons that should get the attention and best efforts of architectural porcelain producers.

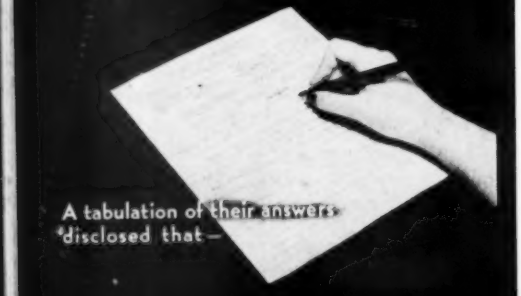
Among the deficiencies mentioned were: wide joints, waviness of surface on large panels, methods of attachment, poor imitations of other materials, slow delivery, stains from steel screws, lack of experience, and the fact that some customers wanted more expensive material.

Here's an opportunity to prove that any and all of these objections can be readily overcome.

The fact that of the architects and product designers reporting 74% of the former and 94% of the latter requested additional information offers a definite opportunity for the porcelain enameling industry. If the strong interest and preference indicated by the survey is to be properly developed, it calls for enthusiastic support of a strong educational and promotional program. →

Nos. 1 to 4


A scientifically selected cross-section of the readers of the American Home magazine were asked to state their preference for finishes on kitchen equipment.



1. *Here is the way part of the questionnaire was worded: 1. What do you think are the most important factors in selecting a heating system? 2. Whose advise would you rely on most when it came to buying a new water heater. Now let's move upstairs and pick out the finishes you'd like for your kitchen equipment.*

2. *There is an overwhelming preference among consumers for porcelain enamel as a finish for products that go to make up a modern, liveable kitchen.*

3. *Porcelain enamel refrigerators are not available at retail stores in quantities comparable to this high consumer's preference. Here is an opportunity for refrigerator manufacturers to take advantage of existing demand.*

4. *3% were interested in other materials; 8% did not answer this question; 89% will want a porcelain enamel interior in their next refrigerator.*

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5. *Porcelain enamel captured third place. Inasmuch as this is the only product where porcelain enamel was not given first place, the product preference should get further study.*

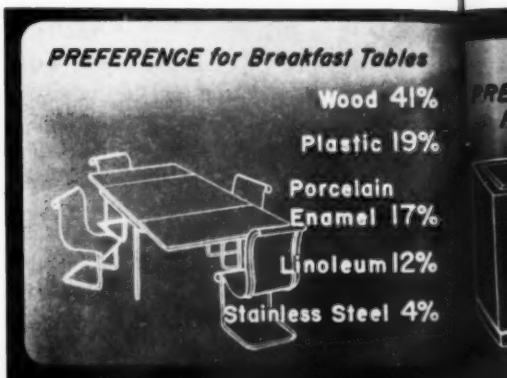
6. *For this practical application, porcelain enamel tops the list. Porcelain enamel has led in this field for many years and should continue as materials become more readily available.*

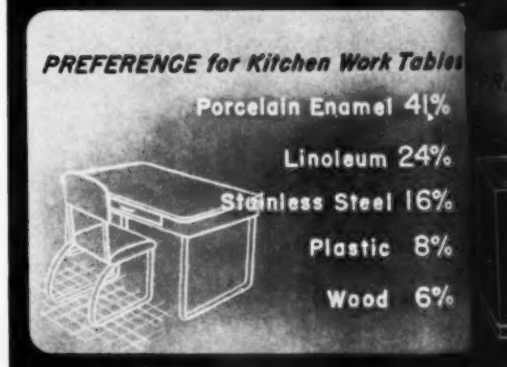
7. *Again, porcelain enamel leads with substantial margin. On any work surface getting constant use, porcelain enamel can readily prove its superiority.*

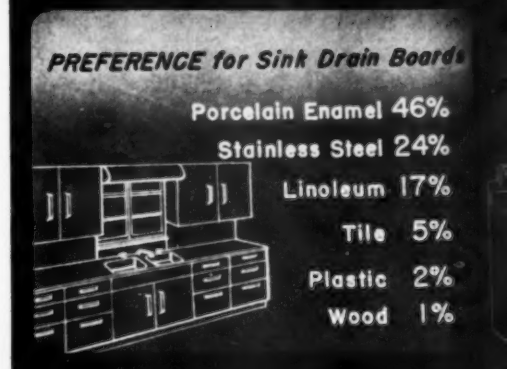
8. *Here porcelain enamel skyrockets to a much higher position. Other materials have been tried, but cleanliness and ease of cleaning prevail with porcelain enamel as the top choice.*

Consumer panel shows fe for porcelain

Nos. 5 to 8







...howeference
...celainameled products

Nos. 9 to 12

9. *21% did not answer this question. Here is a new field where substitute materials may get by until the demand for better finishes is felt by the manufacturers.*

10. *Porcelain enamel compares favorably with the 89% that was reported for refrigerators. Consumers want the same clean interiors for this equipment that they have in their refrigerators.*

11. *Of course, we expect porcelain enamel to be the foremost finish for ranges. It was porcelain enamel that transformed the kitchen "stove" from a black spot in the kitchen into a clean and beautiful piece of modern kitchen equipment.*

12. *The same percentage was reported for porcelain enamel kitchen sinks. Where water, soaps, grease and dirt are a problem, porcelain enamel is the answer.*

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13. *Here's a point for washer manufacturers. As washing machines graduate from the basement to the "laundry room" or kitchen, a "lifetime finish" becomes increasingly important.*

14. *The consumers panel indicates the "reasons" why porcelain enamel is the preferred finish for all major items of equipment in the kitchen.*

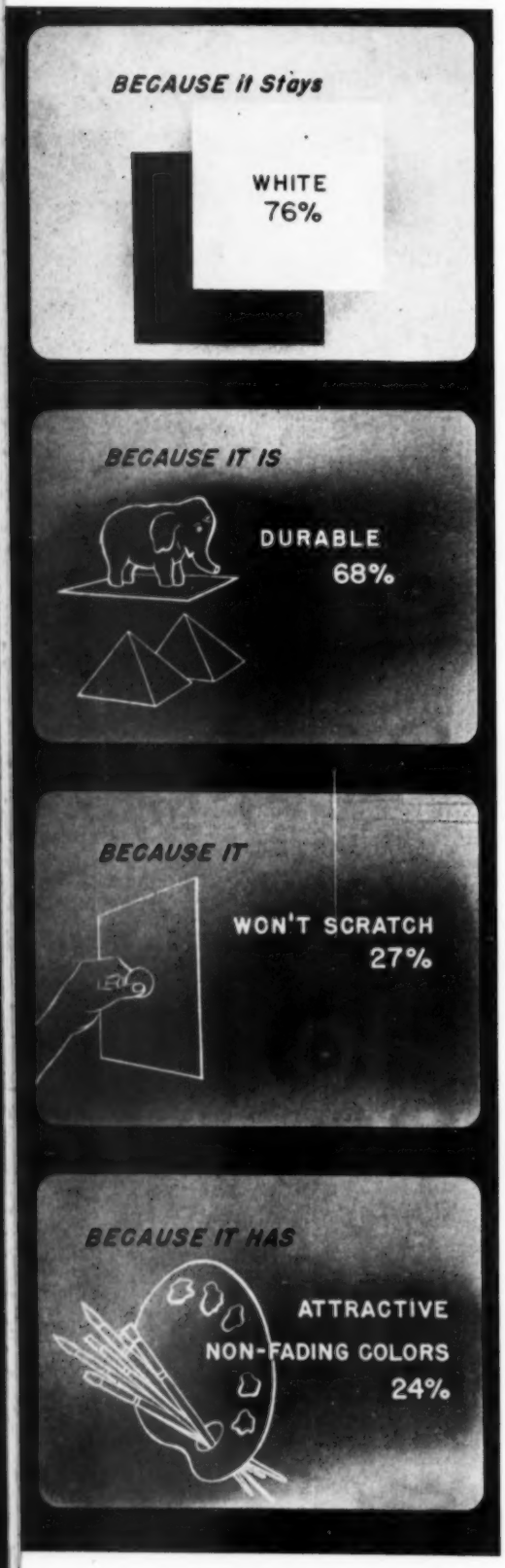
15. *"As easy to clean as a china dish" means something to the homemaker who has the job of maintaining a sparkling kitchen.*

16. *82% of those surveyed consider the sanitary features of porcelain enamel important to their kitchens. There is no substitute that can compete for this feature.*

Nos. 13 to 16

(More) →

Nos. 17 to 20



17. *After five years, ten years, twenty years, or a lifetime, porcelain enamel is the one finish that retains its original whiteness.*

18. *The hardness of glass, combined with the strength of steel, give porcelain enameled products the durability needed for every day use in the kitchen.*

19. *The "coin test" is a convincing demonstration for porcelain enameled products — but — don't try it on products of any other material or with any other finish.*

20. *4% said, "Porcelain enamel blends well with color schemes." Only 2% reported resistance to stains, odors, or acids as chief advantages. It would appear that these advantages may now be taken for granted.*

---

21. *Despite five years of wartime blackout of porcelain enamel for kitchen equipment, phenomenal interest in porcelain enamel has been preserved in the minds of the ultimate consumer buyer.*

22. *Architects and contractors are looking for materials to carry out the housing expansion plans, blue-printed during the war years, with a vast reserve of possibilities for porcelain enamel in housing and new product development still untapped.*

23. *10% of the architects and product designers in the United States received the questionnaire and 1/3 of them replied. They stated their plans for using porcelain enamel and the factors affecting their decisions.*

24. *Although rapid strides were being made in the building field before the war cut off material supplies, the potential is so great as to make any prewar advances seem infinitesimal.*

The architects a… have pla…

Nos. 21 to 24

Porcelain Enamel
—the familiar finish that millions of consumers prefer
PART TWO
Direct Mail Survey of Architects and Product Designers
A scientifically selected cross-section of architects and product designers express their opinion as to the desirability of Porcelain Enamel
70% of the architects plan to use Porcelain Enamel for new projects they are designing or developing.
66% of the architects plan to use Porcelain Enamel for modernization or remodeling jobs.

s designers
plar porcelain enamel

Nos. 25 to 28

22% of the product designers plan to use Porcelain Enamel for new products they are designing or developing

In reaching a decision to use Porcelain Enamel, here are the determining factors as reported by the architects and the product designers.

The ballots cast by the architects in favor of Porcelain Enamel tabulated as follows:

35% Durability
32% Low cost
32% Wide color range
29% Attractive appearance
27% Cleanliness and Sanitation
23% Ease of application
21% Low maintenance expense
19% Flexibility of design
11% Lightweight

Product designers voted as follows:

45% Attractive appearance
36% Durability
20% Low cost
19% Cleanliness and Sanitation
16% Corrosion resistance
14% Acid resistance
10% Heat resistance

25. *Product designers have found in porcelain enameled metal a material worthy of their best efforts in designing for beauty, utility, quality and permanence.*

26. *We have our own conceptions of the advantages of porcelain enamel and their relative importance — it is interesting to see how these compare with the qualities which the architects and product designers consider important.*

27. *Some of the other determining factors which the architects listed as being favorable to porcelain enamel were satisfied clients, fireproof, high cost of masonry labor, uniformity of surface, adaptable to modern architecture, ease of producing long flowing lines and quality of finish.*

28. *Attractive appearance and durability head the list of seven important reasons for using porcelain enamel for the products of the future.*

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29. *Among the many applications listed for use were: Interiors of homes, storeroom paneling, trim, spandrels, medicine cabinets, toilet and shower partitions, water heaters, hospital and restaurant kitchens, and many others.*

30. *Additional information was requested on store front construction, details of application, large scale details and list of special sections that can be secured, color, general industrial uses, types of joints and best methods of attaching to masonry, concrete backed units to be used in place of masonry, and others.*

31. *Among those who listed problems the importance of more detailed information and greater standardization ranked high. In order to capitalize on the national surge in building operations and product developments, full recognition should be given to the problems that are ahead.*

32. *There are many markets where porcelain enamel is welcome but awaits cultivation if it is to grow into a profitable harvest. A strong preference is indicated by consumers and professional men for our material in markets already existing. Porcelain enamel will "grow" as product producers recognize the importance of this existing demand.*

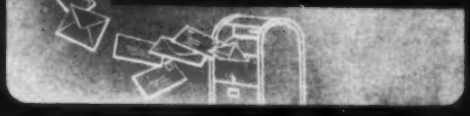
Nos. 29 to 32

Porcelain Enamel, this group reported, is being specified for over 100 different products and applications. At the top of the list are:

Store Fronts – Service Stations Kitchen and Bathroom Equipment Signs and Sign Products

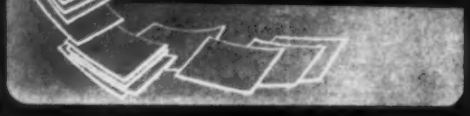
Further evidence of interest in Porcelain Enamel is indicated by

74% of the architects and 94% of the product designers requesting more information



When asked if any difficulties were encountered in working out problems with Porcelain Enamelers, the replies were:

97% of the architects said "No"
80% of the product designers said "No"



These replies indicate that –

Porcelain Enamel is the familiar finish desired by architects and product designers.

McGean Chemical's S. J. Watkins gets a hearty response from Jack Zimmerman, Fletcher Enamel Co.

This truly candid photograph is of L. E. Punderson, of L. E. Punderson & Son Co.

Strict attention is registered here by H. D. Carter, Harshaw Chemical Co., who was co-author of a paper on decorative processes.

Servel's H. P. Juncker flashes an engaging smile for the finish camera man.

SNAPSHOTS AT THE

Above right: Wayne Duvall, of Chicago Vit, explains the situation as Dwight Moore, Bureau of Standards, registers appreciation. Duvall was chairman of a Forum session, and Moore presented a paper on "Research Tests and Test Methods."

Left: Professor R. M. (Maynard) Kind, Ohio State, is snapped on "foreign soil" — the U. of I. campus.

"Turn off the sun" might be an appropriate caption for this snapshot of Eddie Czolgos, one of Century Vit's representatives at the Forum.

The speakers' table at the PEI Forum banquet was representative in that it included university men, manufacturers, and a visitor from England. Left to right are: Prof. R. V. King, F. E. Hodek, Jr., B. B. Kent, Dean Enger, Richard Turk, R. A. Weaver, Prof. A. I. Andrews, Dr. Coleman R. Griffith, and J. E. Hansen.

THE INSTITUTE FORUM

finishfotos

Below: Bob Weaver was feature speaker at the Forum banquet. He is shown here assuming a "poker face" after dropping a bit of wit which is enjoyed by Dean Enger and Richard Turk.

No one would have greater reason for a happy smile over the success of the 1946 Forum than Frank Hodek, Jr., chairman of the Forum Committee. Frank and his committee have been repeatedly lauded for their efforts to assure the continued success of these annual meetings.

Lower left: Dr. Coleman R. Griffith, Provost, U. of I., and Ed. Hansen, Ferro Enamel Corp., at the banquet. Griffith welcomed the Forum at the opening session.

Jim LeMunyon, Tappan Stove, spoke on "The Value of Good Housekeeping."

Porcelain Enamel Institute

fifteenth annual meeting

industry leaders meet at French Lick, Indiana, for policy sessons

THE annual meeting of the Porcelain Enamel Institute was held October 23, 24 and 25 at French Lick Springs, Hotel, French Lick, Indiana, for a review of progress of the various phases of Porcelain Enamel Institute activity and to formulate plans for the coming year. It could hardly be expected that a three-day session at French Lick during October would be devoted entirely to business. Golf and other recreational activities were included as a part of the scheduled program.

The annual report

As a part of the annual report to the membership, formal reports were presented by President Richard H. Turk, Secretary Edward Mackasek, Treasurer William Hogenson, and by the chairmen of the various active committees who do much of the "spade work" essential to the development of the Institute's wide-spread activities.

PRESIDENT TURK, in his report, expressed appreciation for the outstanding work of the Institute committees. He said, "I have been greatly impressed, as well as deeply gratified, with the outstanding services rendered by the various Institute committees. Each has accepted responsibility without question and has carried out assigned tasks with fine cooperation. The Institute is also deeply indebted to the companies from which our committees were enlisted. Were it not for their unselfish attitude, our work could not have been carried on."

EDWARD MACKASEK amplified the president's commendation of the committees by highlighting the work that has been accomplished by each group. In closing, he said, "It is generally felt that 1947 will be a transitional year for industry — a year in which the accent will gradually shift to competition. It will be a year of transition for the Institute, also. The continued progress of the industry will depend upon the same spirit of cooperation and foresightedness that has carried it so far in the past years. There will be greater demands for the services the Institute can render, and it will be our task to organize ourselves so that we can effectively, efficiently, and economically provide them."

1946-47 Officers

President:	Richard H. Turk Pemco Corporation
Vice Pres.:	Herbert R. Spencer The Erie Enameling Co.
Vice Pres.:	W. A. Barrows, Barrows Porcelain Enamel Co.
Vice Pres.:	J. H. E. McMillan Ingram-Richardson Mfg. Co.
Vice Pres.:	R. A. Dadisman, American Rolling Mill Co.
Treasurer:	William A. Hogenson Chicago Vitreous Enamel Prod. Co.
Secretary:	Edward Mackasek Porcelain Enamel Institute

The activity of the Market Research Committee was summarized by committee chairman, ROBERT J. RITCHEY, who stated that during the current year the efforts of his committee were concentrated on two points: a study of consumer preference of porcelain enamel finishes on kitchen equipment, and a study of the architects' and product designers' opinions about the application of porcelain enamel.

F. C. WOLESLAGLE then presented a running commentary with a slide film prepared to show the results of the research work to the membership. *(See "A slide film presentation of research data on porcelain enamel preferences" in this issue of finish.)*

R. A. DADISMAN, chairman of the Market Development Committee, reported on the progress of the Institute's promotional program as developed by his committee in cooperation with the PEI office and Walker & Downing, advertising council. Three principle objectives were outlined:

1. To provide the Institute and the member companies with a well-rounded supply of printed literature containing technical design and engi-

A general good time was had by all at the Olde Timers banquet, to which the entire membership was invited.

Here's a man who is really enjoying himself. It is Ben Birdwell, of Porcelain Metals Corp., of Louisville.

A new vice president of PEI and chairman of the Market Development Committee, Ray Dadisman.

Paul O. Nafe, of Gunnison Homes, is snapped as he tells about prefabricated homes.

Two newcomers in the PEI group are S. J. Gurney and J. U. Meyer of Porcelain Metal Products Co. of Pittsburgh.

Left: Bob Ritchey is the recipient of a prize of unknown value from the hands of PEI president, Dick Turk.

There were some hilarious moments during the awarding of the golf prizes. Here Dudley Clawson receives his prize for the "best dressed golfer."

finishfotos

Bob Calton adds a comedy touch to the prize award routine which is thoroughly enjoyed by Ernie Hommel, golf champion.

neering data, and sales information on porcelain enamel.

2. To place booklets in the hands of engineers, product designers, business management, and others who influence the selection and use of materials where porcelain enamel might be applicable.

3. To publicize the advantages of porcelain enamel as widely as possible to manufacturers who have used or might be able to use porcelain enamel, to their distribution outlets, and to other groups such as architects and independent design engineering firms.

Said Mr. Dadisman, "1947 will be a crucial year. The industry will probably get additional steel some time in 1947, and we will have increasing need for market development work to accomplish the following: To keep established users sold and to advise prospective users on the characteristics of porcelain enamel, how to use it, and where to get it.

G. H. SPENCER-STRONG, chairman of the Products Standard Committee, told how his committee had dove-tailed the work of the PEI Fellow at the National Bureau of Standards with continued development of quality standards. Of fifteen basic problems to be studied, the following eight were chosen as of greatest importance: Adherence, surface abrasion, color difference, impact resistance, thermal shock and strain, alkali resistance, gouge resistance, and gloss.

The chairman indicated that a report on "Color Differences" should be available soon and that tentative specifications for enamel surfaces in general is nearing completion. There are now fifteen definite specifications available as a result of government and war demands.

Edward Mackasek reported for the Forum Committee, of which F. E. HODEK, Jr., is chairman. *(See "Porcelain Enamel Institute Forum" in November finish.)*

As a part of the formal report of the Program Committee, of which C. D. CLAWSON is chairman, the responsibility of the committee was defined as follows: "To correlate and coordinate the diverse activities of the different Institute committees so that they may develop the maximum efficiency of service and measure up to and be in accord with Institute policies and its overall objectives."

HERMAN L. COOK, chairman of the Process Development Committee, reported the selection of the following subjects as being of sufficient importance to justify immediate attention: Spray washing, bright annealing, enamel iron development, present and future status of raw materials, new ceramic coatings, and new ideas in pyrometry.

Work has been started on these investigations, and the committee plans to issue a report to the members on each in 1947.

In the formal report of the Name and Trademark Committee, headed by R. A. WEAVER, was a confirmation of the final report made earlier. *(See "The Finish Line," March finish.)* The committee reached the conclusion that the name should not be changed and, therefore, suggested "that all members of the industry concentrate on the words 'Porcelain enamel' in describing our finish . . . "

President Turk reported for the Institute Development Committee, of which P. B. McBRIDE is chairman. He indicated the objective of the committee as a broadening of the base of PEI activity, the strengthening of its structure, and the expansion of opportunities for rendering greater service to the industry as a whole.

Captive plants to be invited to membership

Included in the suggestions were two new types of memberships: 1. Associate members — captive plants finishing consumer articles or appliances; 2. Professional memberships — for industry men not in the employ of a membership company.

J. A. HOLCOMB presented a comprehensive report on the activity of

to Page 56 →

"Sorry to disillusion you, Old Chap, but if I knew where to get TITANIUM, I wouldn't be in THIS business!"

The Washington round-up

By Wilfrid Redmond

(November 10, 1946)

OPA became a wartime memory November 9 with the removal by executive order of all price controls except those on sugar, rice, and rents. All durable goods, after four years of a price controlled economy, may now compete in a free market without Government restrictions on profits and prices.

A "half-free" economy

The economy, however, is now half-free and half-regulated, and cannot operate in that state effectively for full industrial recovery. Controls still remain on production through the allocation and priority regulations of CPA and NHA, and through Regulation W, of the Federal Reserve Board, whereby curbs still exist on credit selling.

It is expected that these other restrictions will now be swiftly removed. Administrator John D. Small, of CPA, has for some time now been trying to liquidate his agency and may be expected to terminate it quickly now to pace the removal of price controls. He has ordered the removal of controls on textiles and glass containers during the past month and others were under study for decontrol before the order ending the OPA ceilings. In the case of glass containers, Mr. Small ordered decontrol in the face of recommendations by the industry that such action should not be taken before December 31.

CPA favors the plan of turning allocations over to industry with the request that producers follow the CPA pattern until supplies are in balance with requirements.

For the time being, NHA will continue the present controls on distribution which take the form of allocations and setasides. The President, in his executive order ending price controls, said that a new approach would be worked out for the Veterans' Housing Program. The NHA program cannot be expected to hold as it is now with price controls removed from building materials. However, in the case of construction materials and all other products as well, the end of price restrictions may be expected to jump production.

Among the metals

Removal of price controls from reseller scrap ceilings will immediately result in accelerated flow of iron and steel scrap, and lead and copper scrap to consumers. Dealers have been withholding scrap because of low resale ceilings. To release some of this material, CPA during the past month placed tighter controls upon inventories of dealers in copper and iron and steel scrap.

Supplies of lead may be expected to increase as a result of the removal of ceilings on scrap dealers' sales. The National Petroleum Association recently stated that the withholding of lead scrap is one of the major causes of an inadequate lead supply. The association requested OWMR Director John Steelman to coordinate the activities of the Government agencies which are responsible for current lead supply policies. The petroleum industry has recommended that the State Department relax the present policy whereby the U. S. has agreed to purchase foreign lead only in the Western hemisphere. It is pointed out that Australia has a 54-year reserve of lead and we should change our policy with respect to the agreement to purchase lead only in this hemisphere to permit the U. S. to buy Australian lead. Several industries, writing to OWMR Director Steelman, have pointed out that Great Britain has ample supplies of lead, as indicated by a recent advertisement in American newspapers of a British firm offering solid lead toys for sale in this country. On this evidence, we should be permitted to increase our lead deficit by purchases outside this hemisphere, it was pointed out.

The removal of price controls is expected to be followed almost immediately with an announcement by the Federal Reserve Board revoking Regulation W, the wartime installment buying regulation. With price ceilings removed, there is no longer any necessity for retaining this other inflationary control.

Another dramatic step back to a peacetime economy is expected to be taken by the Presient very soon. This will be a proclamation ending the war emergency. It will affect wartime tariffs and public purchase programs and close many Government agencies created for the emergency only.

The removal of price controls and the termination of the emergency are moves by the Administration anticipating action by the Republican Congress which convenes in January.

Improvement expected in alkyd resin supply

The production of alkyd resins is one of the situations expected to be improved by the removal of price controls. Production of these materials has been lagging and in some plants has ceased entirely, the industry committee reported recently to CPA. The committee recommended that CPA point out to OPA that decontrol of alkyd resins is necessary to increase production. Drying oils, which constitute 50 per cent of the raw materials in alkyd resins have now been decontrolled and if the industry analysis of the situation is correct, the main obstacle to improved production has been removed.

Whether price decontrol is the remedy for all production evils will be tested in the case of soda ash. At a recent meeting, CPA announced that by agreement with the Soda Ash Industry Advisory Committee the voluntary plan of distribution of soda ash, which worked so successfully during the war, would be reinstituted. The committee estimated that the present production of soda ash is 15 per cent below the requirements of essential users and saw no immediate possibility of an increase in production next year. The needs of all consumers of soda ash will, under the

voluntary plan, be taken care of on an equitable basis.

Porcelain Enamel houses

Plans of NHA for the production of enameled houses by the Lustron Corporation at the wartime Chrysler-Dodge plant in Chicago have been deflated by the RFC which has rejected an application by the company for a loan to finance production. NHA announced plans for enameled house production at the Chicago plant after War Assets Administration had leased the plant for the manufacture of an automobile advertised as the Tucker Torpedo. WAA refused to back down on the agreement with the automobile manufacturer even though NHA threatened to issue a directive setting aside the WAA commitment. At the moment, it appears that RFC and WAA have won over Mr. Wyatt.

Concrete bathtubs?

NHA is at present negotiating with two manufacturers for the production of concrete bathtubs for the Veterans' Housing Program — for the enameled houses, Washington wags have been unable to resist commenting.

The CPA Plumbing and Heating Manufacturers Industry Advisory Committee recently recommended that the setasides of NHA including bathtubs be reduced inasmuch as remaining production at this time is insufficient to meet minimum standards of repair and maintenance. It is expected that NHA will make some concession, now particularly in view of the price decontrol order. Mr. Wyatt will need all the support he can get from industry in order to continue the housing program.

On the production front

Production of bathtubs topped all previous marks in September, going to 107,000 units. Production of 736,000 bathtubs during the first nine months of 1946, however, was still 25 per cent below estimated requirements for the same period for all needs.

Production of domestic mechanical refrigerators in September was 231,146 units compared with 211,685 in August.

Production of standard size washing machines was 195,310 units in September compared with 189,763 in August.

(The apparent discrepancy between these production figures on washing machines and the figures released by AWIMA — see page 39 — are atttributable to the fact that the figures here include production of non-member companies.)

Production of gas ranges (Cooking) in September hit 155,648 units compared with 168,951 in August. September production of electric ranges (standard type) was 51,461 units compared with 54,864 in August.

Refrigerator shipments hit $80 million for six months period

Shipments of domestic mechanical refrigerators during the first 6 months of 1946 totaled 821,000 units, valued at $80 million, according to a report of the Bureau of the Census.

Shipments of standard size domestic washing machines during the first 6 months of 1946 totaled 844,000 units, valued at $50.8 million.

Shipments of porcelain enameled products dropped from $7.2 million in August to $6.7 million in September, compared with $3.3 million during September, 1945.

Shipments in September were as follows:

Signs	$ 371,637
Stove parts (sold as such)	637,920
Refrigerator parts (household and commercial)	470,592
Reflectors, including fluorescent reflectors)	422,787
Cooking, household, and hospital utensils	2,360,563
Table tops (kitchen cabinets, dinette sets, breakfast sets)	476,506
Store fronts and other architectural porcelain parts)	133,341
Washing machine parts	655,764
All other	1,199,461

When the White House order was issued, OPA had determined upon a price increase factor of 15 per cent in the maximum prices of all porcelain table top manufacturers. The action would have been effective November 18.

"If it's any consolation, Lady - - The Government is having considerable difficulty with its Surplus Property too!"

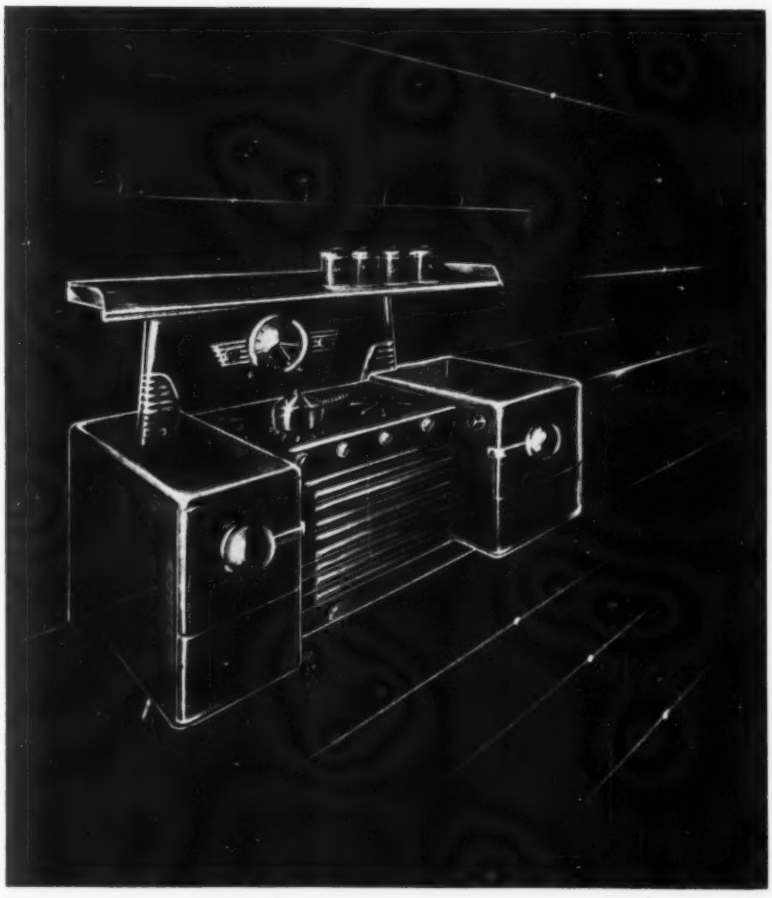
Something new in the range picture

THE accompanying range design, released exclusively to *finish*, is fresh from the drawing board. It represents the inspiration of a designer who is both experienced in appliance design and familiar with the specific requirements of the range manufacturing industry. The range, as shown, would be practically all porcelain enameled. Wilbur Henry Adams, of Erie, Pennsylvania, its creator, has, according to his own statement, "been sold on the idea that if there is anything better than porcelain enamel on a stove, it would have to be porcelain enamel on two stoves."

Features of this design include reduction in the depth of the burner section to a minimum, accomplished through the use of staggered burners. This obviously eliminates the "reach over" for the housewife when working on a back burner. Dual ovens are another feature — one on the right and one on the left — with controls so placed as to be convenient to either hand. Both ovens would have broilers beneath. Under the cooking surface are bins for pot and pan storage with doors that swing out. Decorative relief is provided by the fluted front.

The unusually large condiment shelf has fluorescent lighting concealed underneath. The clock has a large red sweep hand. Says Mr. Adams, "Why have a small clock on a kitchen stove? Why not have one that will serve the purpose of the kitchen clock also, and one that can be easily seen from a greater distance."

WILBUR HENRY ADAMS — Although Mr. Adams' work is not in any sense confined to the appliance field, he got his start in the designing profession through work for a stove manufacturer. He has served as design consultant for such companies as Perfection Stove Company, Kalamazoo Stove Company, Electromaster, Inc., Tennessee Stove Works, Keeley Stove Company, etc.



COMPLETE *Finishing* SYSTEMS

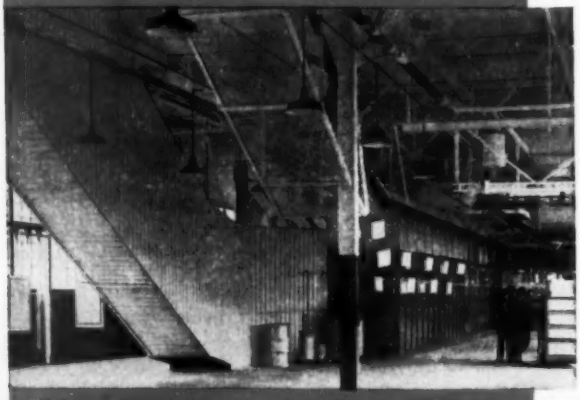
for ENAMEL • LACQUER • PAINT

Mahon Staggered Finish Coat Spray Booths in the Complete Finishing System at the American Central Plant.

This is a Complete Mahon Finishing System with the outer housing removed . . . it was designed to handle refrigerator cabinets.

Here's Planning, Engineering, Building Installation and Housing by Mahon

Completely Housed-in Mahon Finishing System at the Plant of the American Central Manufacturing Corporation, Connersville, Ind.



Mahon Staggered Prime Coat Spray Booths and the up-tunnel to Ovens overhead—part of the American Central installation.

When the Mahon organization plans a Complete Finishing System from the ground up—engineers it, builds every unit of it, installs it and houses it, they finish up with the best engineered, most efficient operating system obtainable in the world today . . . a system that has been designed around the particular product to be handled, and engineered to turn out the finest possible finish at top production rate. In the installation illustrated here, the greater part of the complete system was erected outside of existing buildings . . . the entire contract—including necessary housing, which became an integral part of the finishing system—was handled by Mahon. This is typical of what Mahon engineers are doing for hundreds of manufacturers all over the world . . . their reputation in this highly specialized field is not mere coincidence—years of pioneering and scientific research has endowed them with a wealth of technical knowledge and practical know-how not available to you elsewhere. Consultation will not place you under obligation.

Address INDUSTRIAL EQUIPMENT DIVISION

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HOME OFFICE & PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems including: Metal Cleaning Machines, Rust Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, and Drying and Baking Ovens. Also Paint Reclaiming Units, Hydro-Foam Dust Collecting Systems, and many other Units of Special Production Equipment.

MAHON

NEWS

American Central Manufacturing Corp., Connersville, Ind., announces that Gene Henry, formerly with American Central's sales division, moves up as supervisor of production control.

New control man at Harvey Div. American Stove

According to a recent announcement by F. W. Rozene, enamel shop superintendent, Harvey Division of the American Stove Company, Melvin B. Gibbs is now ceramic engineer in charge of enamel plant control. Gibbs is a recent graduate of the University of Illinois, with a B.S. degree in ceramic engineering.

Mr. Gibbs left the University of Illinois in 1942 to enter the Army Air Forces with a B-29 group. He served overseas in India and the Marianna Islands for 21 months, was discharged from the army in February, 1946, with the rank of Captain, and re-entered the university in March.

Armstrong to merchandise Veos tile

Executives of Clyde Porcelain Steel Corp., Clyde, O., manufacturers of VEOS, porcelain-on-steel wall tile, are announcing a new marketing arrangement for this product.

Negotiations have been completed with the Armstrong Cork Co., Lancaster, Pa., for distributing the entire output of VEOS tile.

The Armstrong Co. has 21 district and branch offices in key cities and through them will service the tile accounts spread over most of the United States.

In making the announcement, R. R. Trubey, president of Clyde Porcelain Steel, has emphasized that it is strictly a new marketing arrangement and that VEOS tile will continue to be manufactured by Clyde Porcelain Steel Corp. at its Clyde plant. It will also continue to be shipped direct from the plant to the franchised dealers.

Titanium dioxide to remain in short supply

In the January, 1946, issue of *finish* a feature article, by C. M. Andrews and A. I. Andrews, covering research data on titanium type enamels appeared. For many months, commercial frit manufacturers have been developing titanium enamels. Today it is conceded that enamel formulas are available that would place this type of frit in a strong competitive position were it not for the fact that there is an acute shortage of titanium dioxide.

It is expected that new production will come in during the first quarter of 1947, but it is the belief of leading producers that it will not be sufficient to bring real relief. One large producer offers the opinion that the porcelain enameling industry will not be able to obtain more than 10% of their total requirements next year.

Finish reprint offered by BCR

Reprints being distributed by Bituminous Coal Research, Inc., national research agency of the bituminous coal industry, are "ringing the bell" with fuel technicians and railroad motive power men, according to word from Pittsburgh, based on present response to two timely articles getting widespread circulation by the BCR organization.

"Have You Considered Overfire Jets for Smoke Abatement? a reprint from *finish*, and "The Supply of Air to Coal-Fired Steam Locomotives," a reprint from the July (1946) Transactions of the American Society of Mechanical Engineers, are the papers which are reported to be attracting more-than-average attention at this time.

Vitro Manufacturing announces additions to staff

Announcement was made by the Vitro Manufacturing Company, of Pittsburgh, Pa., that Daniel N. McCarthy recently joined the sales department as a sales-service engineer. McCarthy attended St. Louis University, of St. Louis, Mo. He was then connected with the Obear Nester Glass Co., East St. Louis, Illinois, as manager of the ceramic department. Leaving there, he joined the Army Air Forces, serving as an instructor in engineering.

Vitro has also added Robert G. King to its sales department as a sales-service engineer. King, a graduate in chemical engineering of Grove City College, Grove City, Pa., formerly served as an instructor in chemistry at the same college. Prior to entering the Army Air Forces, he was associated with the Pullman Company, of Butler, Pa., as a metallurgist.

Washer-ironer shipments near industry's all-time peak

Factory shipments of household washers in September were second highest for any month this year, totalling 184,215, compared to 186,965 in the preceding month, according to an announcement by the American Washer and Ironer Manufacturers' Association. The month was exceeded by only three others in the history of the industry. Shipments were 12.3 per cent above 163,324, the monthly

average for 1941, final prewar year of full production in the industry.

Ironers shipped in September aggregated 13,413, compared to 10,869 in August and 17,991, the monthly average for 1941. It was the year's best month for ironers, topped only by 14,201 in June.

Overcoming a slow start at the beginning of 1946 caused in part by shortages of materials and labor, the industry has brought washer factory shipments in the first three quarters of the year up to 1,364,007. This compares with 1,469,916, three-fourths of the 1941 total. The ironer total is 85,420, compared to 161,997.

Mullins Manufacturing Corporation, Warren, Ohio, announces the promotions of two headquarters men. Robert J. Whitlock was named assistant to Harry A. Armbright, director of sales training, and Clarence T. Fullerman was appointed assistant director of the markets and distribution department, headed by Robert H. Wack. Both Whitlock and Fullerman are World War II veterans.

Briggs puts new $250,000 porcelain enameling plant into production

Explaining mass production technique applied to the porcelain enameling of plumbing fixtures to National Housing Expediter Wilson W. Wyatt is Walter O. Briggs, Jr., vice president of the Briggs Manufacturing Co.

Wilson W. Wyatt, national housing expediter, visited the Briggs plumbingware plant in Hamtramck recently to witness the inaugural run of new porcelain enameling facilities which will immediately increase by 50% the output of Briggs plumbing fixtures. Other Detroit and National Housing authorities, and Detroit's Mayor Jeffries were among those invited to attend the ceremony.

In accepting the invitation to attend the ceremony, Wyatt praised the Briggs record production effort on plumbing fixtures since V-J Day.

The greatly expanded production rate comes at a time when the shortage of plumbingware constitutes one of the most critical items in the current housing bottleneck.

Production of Briggs fixtures durthe first six months of 1946 was reported up 115 per cent over the same period of 1941. With the new facilities now in operation, the company will turn out 75 bath tubs an hour. Its capacity for lavatories will be stepped up to 300 an hour, and for sinks to 300 an hour.

"Our production of Beautyware has been climbing steadily ever since we finished converting our plants in mid-November last year," W. D. Robinson, Briggs president, said. "Our new porcelain enameling line, equipped with a conveyor system designed by our automotive production engineers, now adds 50 per cent to the capacity of the plumbingware division . . . " The new porcelain enameling department includes a 132-foot continuous porcelain enameling furnace, one of the largest of its kind in the country; a battery of drying ovens; and a complete new porcelain enamel application department.

George P. Eichelsbach, Jr., began with the American Stove Company's St. Louis plant in 1935 as an egnineering draftsman and became successively chief engineer of the St. Louis Division and chief engineer of the entire company, has been elevated to director of manufacturing and engineering by the board of directors.

Sourbeck — fifty years of service

T. M. Sourbeck *(see "People You Know or Should Know," October, 1946, finish)*, manager of the American Stove Company's Lorrain, Ohio, Division, celebrated his fiftieth year of service with that company and its predecessors in September of this year.

In addition to congratulatory messages from many of his friends in the stove industry, Mr. Sourbeck was presented with a gold wrist watch by his co-workers at the Lorain plant.

Harold E. Jalass has been appointed general sales manager of Cribben and Sexton Company, manufacturers of Universal gas ranges, according to an announcement by W. M. Hillborn, executive vice president of the company.

As previously announced in *finish*, in August Mr. Jalass was appointed assistant general sales manager to John E. Bogan, whom he now succeeds.

Brown expands sales and service staffs

A group of 45 new sales and service engineers have been added to the

expanded field staff of the Brown Instrument Company, Philadelphia.

The group of 45 men will be assigned, about the first of the year, to various regional offices and branches throughout the country, according to W. H. Steinkamp, field sales manager of the industrial division of Minneapolis-Honeywell Regulator Company. All of the men are attending the Brown Company School of Instrumentation at Philadelphia.

The G.A.M.A. "planning board" gets busy

Planning future activities for the Gas Appliance Manufacturers Association are, left to right: H. Leigh Whitelaw, managing director of the Association; John Robertshaw, first vice president; Lyle C. Harvey, former president; and D. P. O'Keefe, present president, pictured at GAMA's exhibition in Atlantic City during the recent gas convention.

Major R. A. Jones has been sent by the Air Material Command of Wright Field to the Department of Ceramic Engineering at the University of Illinois for further training in ceramic engineering. He is working for the Doctorate in Engineering. Major Jones received his Bachelor of Science degree in June, 1938, and his Master of Science degree the following year from the New York State College of Ceramics at Alfred, New York.

Canadian Ceramic Society schedules 45th annual convention

The 45th annual convention of the Canadian Ceramic Society will be held at the Royal York Hotel, Toronto, on February 17, 18 and 19, 1947.

The details of the three-day program have not been worked out, but plans are said to be under way that will make the meeting a most profitable and interesting one.

North Carolina State news

The Ceramic Engineering Department of North Carolina State College has an enrollment of 65 undergraduates and 2 graduate students for the fall term. Of the 65 undergraduate students, it is expected that 7 will graduate in the spring. Many of these students have returned from the armed services.

The Student Branch of the American Ceramic Society held its first meeting of the school year October 8. Officers of the Student Branch are: Alton W. Thomas, president and senior representative on the Engineer's Council; Hugh H. Wilson, Jr., vice president; Hugh McGee, treasurer; and Alton M. Faires, secretary. Junior representative on the Engineer's Council, Ernest A. Clark; alternate is Philip S. Knowles.

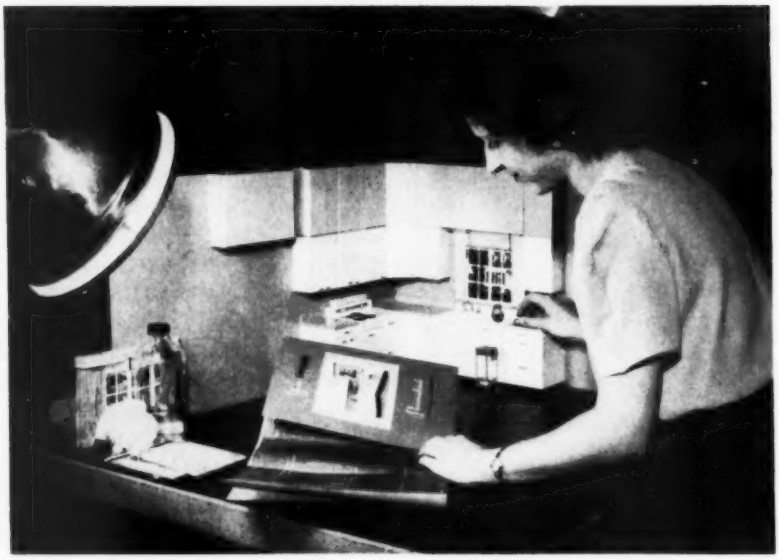
The first meeting of the N.C. Chapter of Keramos, after a lapse of several years, was held on October 11. Twelve active members and three alumni members were present. Officers elected for the school year are: John G. Vann, Jr., president; Richard Dammann, vice president; Hugh H. Wilson, Jr., treasurer; Willard B. Midgette, secretary; and Robert E. Brickhouse, herald.

(More) →

The new official family of the Moore Corporation, Joliet, Ill., manufacturer of gas heaters, combination ranges, gas ranges and coal heaters includes: seated, Bernard J. Hank, president, chairman of the board and treasurer; standing, left to right, Orville E. Oesterle, general plant superintendent; W. A. Stuckey, chief engineer; Harry T. Worthington, vice president and general manager, and John M. Foxx, vice president.

The department has announced the appointment to its staff of two N.C. graduates: Martin W. Parcel and Charles V. Rue.

Hotpoint kitchen planning and "building" service



More than 650 different kitchens for new houses for war veterans were designed to fit kitchen dimensions, then "built" in miniature so that the customer could see what his kitchen would look like before he ordered the appliances and cabinets. Each miniature is an exact reproduction of the actual appliance. The camera is moved in close in making the picture to create the finished illusion of an actual kitchen picture. The war veterans' kitchens were designed as part of a program by which all-electric kitchens were allocated to 1,000 G I's across the nation for new homes by Edison General Electric (Hotpoint) Appliance Co. The company will supply this planning service for a charge of $3 for each plan and picture.

Packing materials remain a bottleneck

Shortage of steel wire has created a new obstacle for wirebound box manufacturers who have been striving since the close of the war to achieve full production despite continuing scarcities of veneer and lumber.

Lack of critical materials already has reduced the industry's production to less than 50 per cent of capacity and the shortage of wire is taxing the ability of the manufacturers to maintain even this low rate of output, according to Mr. L. S. Beale, secretary of the Wirebound Box Manufacturers Association.

Early results of experiments at four universities and research laboratories indicate that it may be possible to manufacture a suitable composition material of forest or agricultural waste products to supplement available veneer and lumber, according to Mr. Beale. He added, however, that it is still impossible to predict when the wirebound industry will be able to fill all the demands for its products.

Koppers Company building precipitators

Precipitators which will remove either solid or liquid particles from plant discharge gases are made available to American industry by Koppers Company, Inc., it has been announced by Walter F. Perkins, vice president of the company and general manager of its shops division.

Called the Koppers-Elex Electrostatic Precipitator, the equipment will be engineered and built at Koppers' Bartlett-Hayward Plant and will, according to the manufacturers, remove boiler fly ash, tar, acid mists, soda ash, fluorides, catalysts, dust and other nuisances or valuable byproducts.

Suggested applications include: steel plants; ceramic, refractory, and abrasive manufacturers; foundries; or to control dust from mixers, dryers, conveyors, grinding mills, elevators, crushers, and from the air.

Bendix has $3,000,000 budget for 1947 appliances advertising

A $3,000,000 budget for advertising in 1947 is planned by Bendix Home Appliances, Inc., members of the Cleveland Advertising club were told by Walter J. Daily, advertising and sales promotion director. Mr. Daily said: "Despite the tremendous demand for Bendix automatic washers, as shown by surveys, we have been building our organization and our advertising program on the premise that every machine must be sold. We are relying a great degree on advertising, sales promotion and publicity to carry us through the buyers' market which will come next year."

Oil burning space heaters reach 1941 volume

Word that production of vaporizing oil burning space heaters has reached 1941 volume has emphasized the entrance of a comparatively new factor in the postwar heating field. Manufacturers are said to be pushing output to the limit of material availability to supply the demand for these heaters, as well as for vaporizing oil burning water heaters, floor furnaces, and warm air furnaces.

Burning a light grade fuel oil generally obtainable, the new space heaters are being produced in a wide variety of styles, sizes and colors to heat from one to five rooms either through natural radiant heat, gravity circulation or by means of forced warm air circulation. Most of the heaters have from 30,000 to 65,000 b.t.u. output per hour, depending on the model and the use for which it is intended. The vaporizing oil burner industry expects to produce 1,000,000 to 1,500,000 units a year for the next five years.

Vaporizing oil burners employ a

LEFT HIGH AND DRY BY COLOR PROBLEMS?

EVERY production chief knows from experience that the unexpected can founder colored porcelain enamel manufacturing schedules and waste a lot of money.

But the economy-minded chief who flashes an SOS to Drakenfeld quickly learns that practical help, backed by many years of experience, can go a long way toward cutting the high costs created by color problems.

So if you are interested in minimizing rejects, increasing production, and saving time and effort, call on Drakenfeld for dependable porcelain enamel colors. And if it is a color-matching job that is bothering you, our technologists will gladly cooperate in developing a formula that fits your frits and your methods of production.

Get in touch with Drakenfeld. Learn how we have solved color problems for manufacturers of signs, architectural and industrial porcelain enamel, and for producers of utensils and appliances used in the home, in institutions and in the medical profession. Write today.

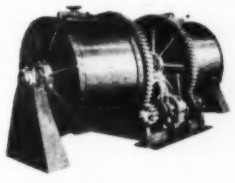
DEPENDABLE SERVICE ON: Screening Paste . . . Graining Colors . . . Squeegee Oils and Mediums . . . Spraying and Banding Mediums . . . Chemicals . . . Rotospray Sifters . . . Porcelain Grinding Balls . . . Porcelain Mill Linings . . . Steveco Mills.

If It Flows ROTOSPRAY Can Strain It!

Saves time and labor. Strains through a vertical screen—no clogging. Long-life screen often saves enough to pay for the equipment. Standard and Junior sizes. May be suspended or placed on floor. Capacity ranges from 300 to 1000 gallons per hour, depending on the nature and specific gravity of the product, screen mesh and size of sifter. Descriptive folder sent on request.

5 SAVINGS WITH STEVECO MILLS

Time
Labor
Horsepower
Floor Space
Initial Costs



Steveco high-efficiency duplex mills wet-grind porcelain enamel materials better, faster, and at low cost. Many outstanding construction features proved in hard day-after-day service in many plants. Wide range of sizes and linings, with all types of drives. Write for catalog, then let us study your grinding needs and recommend the correct type for your requirements.

YOUR PARTNER IN SOLVING COLOR PROBLEMS

B. F. DRAKENFELD & Co., Inc. 45-47 Park Place, New York 7, N. Y.

Factory and Laboratories: Washington, Pa.

Pacific Coast Agents: Braun Corp., Los Angeles 21 . . . Braun-Knecht-Heimann Co., San Francisco 19

pot-type chamber into which the fuel oil is fed by gravity to the bottom surface and then is vaporized by the heat carried down from a flame above. The vapor is mixed with a small quantity of air and combustion takes place in a combustion chamber above. Thus, the oil itself does not burn in liquid form; instead, the oil is vaporized and the vapor is mixed with air to produce a clean, even and easily controlled flame.

A backlog of approximately 1,600,000 unfilled orders for flue-connected oil burning space heaters, each requiring some 650 gallons of fuel oil per year, is reported by the United States Bureau of Census to members of the Oil Division, Cooking and Heating Appliance Manufacturers.

Edward M. Skipper has been appointed to the position of manager of manufacturing of the Locke Insulator Corporation, according to an announcement by R. G. Bellezza, president of Locke.

Consolidated net earnings after deduction of Federal taxes of the Pennsylvania Salt Manufacturing Company, for the 12 months ending September 30, were $1,790,863.77 or $2.39 per share on 750,000 shares of $10 par stock, Leonard T. Beale, president, announced after the annual meeting of shareholders October 23, in the company offices. The net earnings for the same period ending September 30, 1945, were $1,356,296.98, equivalent to $1.81 per share, Mr. Beale reported.

Renown gives "quick delivery"

Shown here before the takeoff are Renown's sales manager, M. J. Turck, President B. A. Nagelvoort, and W. C. Schneider, Michigan territory manager.

Renown Stove Company, of Owosso, Michigan, and its Hartford, Connecticut dealer, Park Appliance Center, Inc., cooperated recently in a "quick delivery" of combination ranges.

Ranges for the shipment came off the Renown assembly line shortly before 8 o'clock Tuesday morning, October 22. They were transported immediately to the Flint airport and loaded in a huge National Skyway Freight Corporation cargo plane which took off at once, arriving in Hartford in the early afternoon. By evening several of the ranges were installed and working in the homes of Park Appliance Center customers.

Appointment of Mrs. Mary Belle Burnett, director of the Home Service Division of the Cincinnati Gas and Electric Company, Cincinnati, Ohio, as chairman of the Home Service Committee of the American Gas Association has been announced by W. M. Chamberlain, chairman of the Residential Gas Section. Mrs. Burnett succeeds Mrs. Lillian P. Dunbar, home service director, Cambridge Gas Light Co., Cambridge, Mass., who served during the 1945-1946 AGA fiscal year.

AGA man enters appliance field

Completing nearly twenty years of service, Franklin R. Wright, supervisor of the American Gas Association Cleveland Testing Laboratories, has resigned to enter the gas appliance manufacturing field. He has established the Wright Manufacturing Corporation at Delaware, Ohio, and will build automatic storage hot water heaters.

Wright joined the Laboratories as a test engineer early in 1927, a few years after its establishment and with the exception of Mr. Conner, who organized the Laboratories in 1925, was the oldest employee in point of service. He is credited with contributing much to the Laboratories' growth and prestige, occupying various positions as inspector, manager of publications, supervisor of requirements committee activities, chief inspector, manager of testing and inspection departments, and in February, 1945, was appointed Supervisor.

Wright taught science for several years and spent four years in the steel industry before entering the utility field in 1925.

At a membership meeting of the Natural Gas Department of the American Gas Association held in Atlantic City on October 7, it was voted to hold the Natural Gas Spring meeting in Chicago on April 30, May 1 and 2, 1947, with headquarters at the Stevens Hotel.

Spectrophotometer used for color matching

General Electric Company reports that a GE recording photoelectric spectrophotometer, an instrument which can measure and record as curves on a graph over two million shades of color, is now in use at Pemco Corporation, Baltimore, to simplify the matching of porcelain enamel colors and provide a constant quality control check. The instrument is expected to save from two-thirds to three-fourths of the time needed

to match colors at Pemco as compared to former methods, according to the report.

By using the spectrophotometer, Pemco has established a library of over 1,000 color curves of known composition, representing every color produced since installation of the instrument. When a customer submits a sample color, it is analyzed by the spectrophotometer and the resulting color curve is matched as closely as possible with one of the curves in the library. In this way, comparisons are made quickly, independent of the physiological factors which affect human judgment.

Bendix expects sales total of $29,000,000 for 1946

A 50-cent dividend on the common stock of Bendix Home Appliances, Inc., was voted by the board of directors at a meeting in New York City on November 11. It is payable December 18 to stockholders of record on November 29, 1946.

Judson S. Sayre, president, reported that the company, during the 10 months ended October 31, had sales of $23,000,000, and said that the continuance of the present operations indicates an increase in this figure of approximately $6,000,000 for November and December of this year. *The company has started the manufacture of an automatic home dryer and an automatic home ironer.*

Enameledware advertising pulls 40,000 replies

In the Enameled Utensil Manufacturers Council advertising campaign that has been running in women's magazines a booklet was offered in a coupon. To date the advertising department reports that over 40,000 four-color booklets have been mailed to readers on coupon requests.

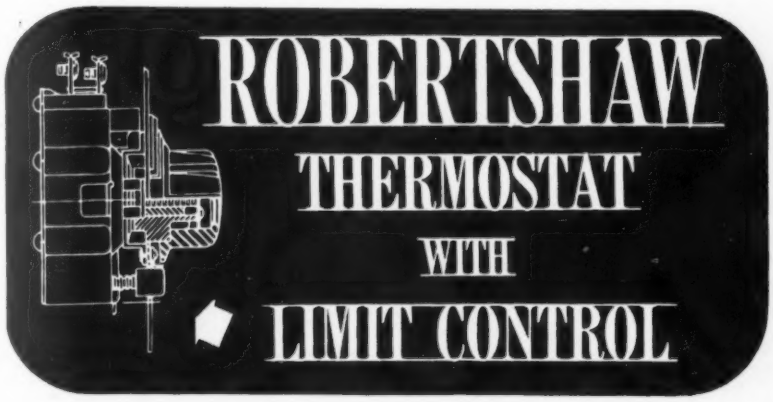
A report credited to C. G. Frantz, president of Apex Electrical Mfg. Co., indicates the completion of a cooperative agreement between the Cleveland firm and Vactric, Ltd., of London, England, for the production of washing machines in England. A similar manufacturing arrangement is reported to have been in force before the war.

Ernie Martin dies

Ernest B. Martin, 64, for forty-three years a sales representative of American Stove Company, recently suffered a cerebral hemorrhage while walking along the street near his home in Chicago and died two days later at Ravenswood Hospital.

Ernie, as he was known throughout the industry, for many years supervised Magic Chef sales in Illinois, Iowa, Nebraska, Colorado, Wyoming, Utah and Idaho. He accepted his retirement pension on August 1, 1945, because of failing health.

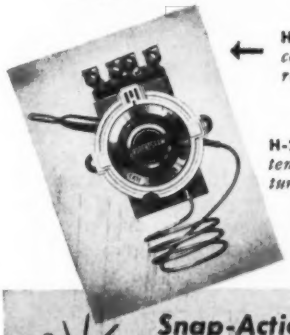
New porcelain enameled steel shingles in any color or finish will aid prefabricated housing and help swell roofing supplies generally, McCall's Magazine reports. The porcelain finish protects against erosion.



Model **H1** is a double pole, single throw control using Robertshaw's exclusive "Over-center" snap action mechanism, combined with an auxiliary single pole, single throw switch. In the event of overheating beyond the predetermined safety point through any cause, the switch will automatically cut off all current and lock in an open position until contacts are resumed by pushing in on manually operated re-set button.

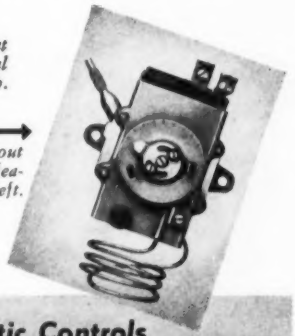
This Robertshaw Electric Thermostat is a sturdy precision instrument. Being very accurate and dependable, it is widely used on sterilizers, autoclaves, incubators, coffee urns, steam tables, deep-fat fryers, etc. It is highly suitable for use with contactors and solenoid valves for air, gas, steam or water.

Write for full information on these and other Robertshaw thermostats for pressure control, oven control, automatic "High-low" switch on parallel hook up, cooking, heating and water heating applications, as well as dual control for low water cut-off and vapor control of temperature.



← **H-1** *Electric Thermostat combined with manual re-set limiting switch.*

→ **H-2** *limiting switch without temperature controlling feature of H-1 shown to left.*



Snap-Action Thermostatic Controls

ROBERTSHAW THERMOSTAT COMPANY

Youngwood, Penna.

From the Editor's mail . . .

Reply to the "Finish Line"

In our editorial in the November issue of finish *we spoke in favor of the continuation of the present plan of holding the PEI Forum meetings on the campus of a university. The following letter was received in response.*

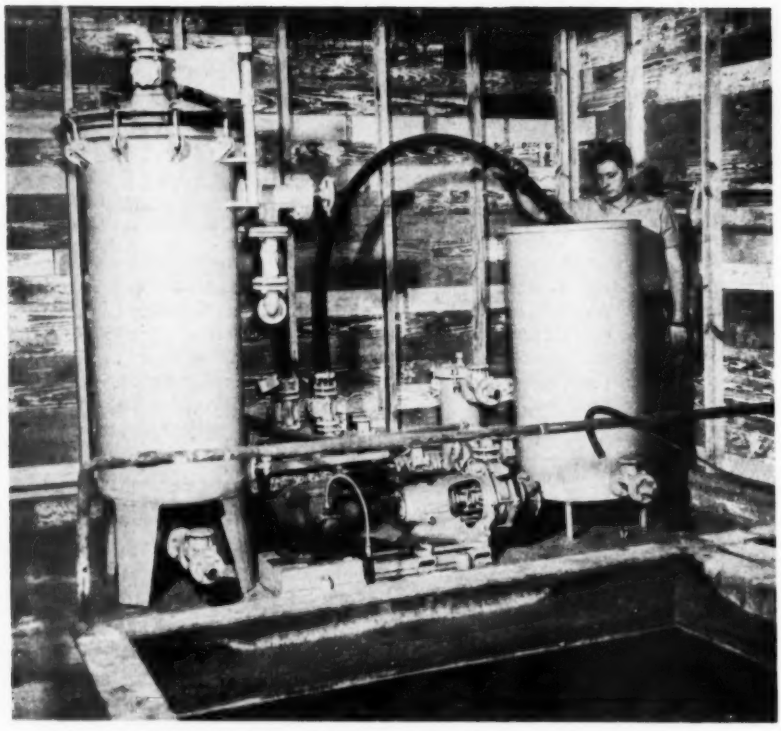
Finish Magazine

"I have looked over the November edition of *finish* and find it to be of the same usual good pattern that you have been following for quite some time. However, I cannot exactly agree with your editorial advocating that forum meetings of the P.E.I. be held in university centers. You were present at the latest and possibly have more of a first-hand acquaintance than I, but I can state that if all firms had the same experience that we did, then the meeting just concluded was minus the presence of several hundred men. To sum up briefly, I entered reservations immediately upon receipt of the correct forms and was advised within a representative period of time that no accommodations could be assigned to myself and two other members of this organization in Urbana. Reference was given to hotels in three outlying communities, but none could accommodate. We, therefore, gave up the notion of attending this forum.

"I realize that there are university centers such as Ohio State and Pittsburgh that are located in cities having sufficient accommodations to handle large gatherings. Most university towns do not, and unless future meettings are scheduled in university towns possessed of sufficient hotels, our organization, for one, will not be interested and I know of several others."

Signed: H. J. McCracken, President
The Northwest Chemical Co.
Detroit, Michigan

INDUSTRIAL PRESSURE FILTERS — A *MUST* FOR MODERN PICKLE ROOMS



A typical Industrial Filter installation in the pickle room at Ingram-Richardson Mfg. Co. of Indiana, Frankfort, Indiana.

Save time, save money, and keep your new pickle room at top efficiency. Include Industrial pressure Filters in your plans for a modern plant. Send for specifications on a unit to meet your requirements for a dependable clarification and purifying system.

Made in a range of sizes and capacities, both portable and stationary, they offer the convenient and labor saving method of filtering nickel or neutralizer solutions.

Automatic Filter powder feeders, special alloy pumps, Filter cloth and Filter Aids

INDUSTRIAL FILTER & PUMP MFG. CO.
1621 WEST CARROLL AVENUE • CHICAGO 12, ILLINOIS

Pemco announces two additions to service staff

Theadore (Ted) Buit has joined the Pemco organization after twenty-five years with the Norge Division of Borg-Warner Corporation, Muskegon, Michigan. Ted's first job in the industry was with the Alaska Company in Muskegon. In 1924 he came to the Pemco Corporation under a training program agreement with the Alaska Company, and after a year returned to their Muskegon plant as general foreman. When Alaska was taken over by the Norge Division of Borg-Warner, he continued to work for them in the capacity of plant superintendent.

Harold N. Reed, after his graduation in 1935 from Ohio State as a ceramic engineer, went to work for the Tyler Fixture Corporation, Niles, Michigan, and served as superintendent of their porcelain enamel department until his enlistment in the Army

in 1942. After three and one-half years in the Air Corps attached to the Quartermasters Corps, he was discharged with a First Lieutenant's rating and returned to the Tyler Fixture's Waxahachie, Texas, plant to start their porcelain enamel department. Reed is a member of A.C.S. and the Institute of Ceramic Engineers.

Buit has been assigned to Michigan-Indiana and Reed to Pennsylvania-Ohio and part of Indiana, but, according to the announcement, neither will be confined to these territories in their work.

The Lustron house

Here we see the architect's rendering of the front elevation of the new Lustron house.

THE first Lustron porcelain enameled house was completed at Hinsdale, Illinois, for "unveiling" on Monday, November 18. We had an opportunity to inspect the new house just as the last forms of *finish* were ready for the presses. On the basis of the preview, we would say that this new house, porcelain enameled inside and out, offers an entirely new conception of steel houses. To adequately describe the installation would require far more space than is available for this last minute news coverage.

The Lustron house is the product of Lustron Corporation, successor to Porcelain Products Company, an affiliate of Chicago Vitreous Enamel Product Co., Cicero, Illinois.

The new corporation has as its principals the Hogenson brothers, owners of Chicago Vitreous, and Carl Strandlund, Chicago Vitreous vice president and general manager, who is president of the new organization. From 1909 to 1917 the Hogensons operated as builders of conventional houses in the Chicago area. They built and sold more than 500 homes in the section now known as Austin. Porcelain Products Company was active prewar in the engineering, fabricating, enameling and erection of store fronts, theatre fronts, gasoline filling stations, etc., using porcelain enameled fabricated steel units.

The Lustron house is approximately 31′ x 35′, with the ridge of the roof 14′ from the floor and the eaves 8′ from the floor. With more than 1,000 square feet of livable area, this is said by the builders to be larger than the average five-room bungalow. The side walls, inside and out, are steel finished in pastel shades of semi-mat (non-glossy) porcelain enamel, resulting in a structure that is rust, fire, termite and vermin proof. Walls are insulated; plumbing and wiring are conventional.

Carl Strandlund says he has an entirely practical plan to supply homeless GI's with a 5 or 6 room house completely equipped with radiant heat, refrigerator, range, modern bathroom, cupboards and closets built in, all complete to the keys, at a cost of approximately $7,000. Thirty thousand such homes can be produced in 1947, he claims, with an ultimate peak production of 400 daily. This could mean 120,000 units in 1948.

"Since man got out of caves," Strandlund said, "they have been building dwellings out of available materials: trees, mud and nails. Only steel can be built with true mass production methods, economy and speed. Today we know how to build homes of steel. What World War I taught the automotive industry, World War II has taught home builders."

As this is reported, complete construction details have not been released, but it is understood that complete information will be made available.

Nance to Hotpoint

James J. Nance, of Chicago, was elected executive vice president and a director of the Edison General Electric (Hotpoint) Appliance company at a recent meeting of the board of directors. Simultaneously, details of a major program of expansion by the company was announced by Ray W. Turnbull, president.

Immediately prior to his present appointment, Mr. Nance has been serving on the staff of Charles E. Wilson, president of the General Electric company. For many years he was associated with the Frigidaire Division, General Motors Corp., and he has also held marketing and administrative positions with Zenith Radio and Easy Washing Machines.

Automatic cleaning and pickling prior to porcelain enameling

(Continued from Page 21)

of the soil to be removed, the speed of the conveyor, the contour of the parts to be cleaned and the ability to maintain specific temperatures will govern the design, especially the number of wash and rinse stages to be incorporated in the equipment.

Products coated with pigmented compounds require an emulsion wash, alkali wash and a water rinse. The emulsion cleaning cycle must wet out such lubricants and prepare them for final cleaning in the subsequent spray cycles.

Pump pressures, nozzle design and pressures, and spray pattern will enter in the properly engineered washing equipment. In most instances, it could well be suggested that contemplated features of mechanical equipment be tested in production before final purchase is made.

A mechanized unit may readily be designed as a complete unit to include pickling, nickel solution, neutralizing and dry-off. Many complete processing machines incorporating acid cycles have been manufactured during the past few years. To include some of the chemical cycles now being used, consideration must be given to corrosion resistance. For example, sulphuric acid solutions require rubber lined tanks, special monel metal pumps to spray headers and acid resisting metal for the upper hoods, conveyor chains, etc. More safety features must be provided, including efficient exhaust systems to carry off fumes and steam.

Although various types of equipment and chemicals have been discussed for cleaning prior to enameling, a recommended cleaning cycle could consist of emulsion, rinse, alkali, rinse, sulphuric pickle, rinse, nickel solution, rinse, neutralize, and dry-off. All of these stages can be, and are being, incorporated in a single unit.

Adapted for finish *from an illustrated lecture before the Chicago District Enamelers Club.*

GP&F enamel men advanced

A recent communication from Geuder, Paeschke & Frey Company, Milwaukee, Wis., reports the advancement of Ivan Shroll and Forrest Nelson.

Shroll has been made general superintendent of the plant. He was formerly enameling superintendent at GP&F, and before that was with Benjamin Electric, Norge, and Round Oak Company.

Nelson succeeds Shroll as superintendent of the enamel shop. He joined the organization in May to take charge of control work following service in the Navy. Nelson graduated in ceramic engineering from the University of Illinois in 1939, and did research work at Ingram-Richardson Mfg. Co. of Indiana.

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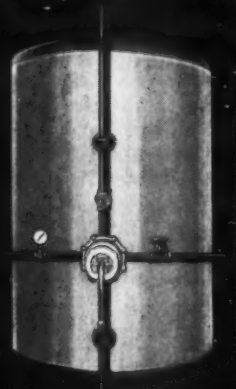

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High temperature ceramic coatings

(Continued from Page 17)

metal. With the application of improved coatings to more rigid tubes of later design, a doubling of tube life was recorded in service tests.

Ceramic base coating about 2 mils in thickness was applied to the alloy buckets of supercharger turbine wheels. Such applications were found to lengthen the service life of the buckets to a very considerable extent. A coated bucket that had withstood 227½ hours of operation on a test stand in the Power Plant Laboratory, Wright Field, was sectioned and photomicrographed at 500X. This photomicrograph, in Figure X, shows about one-half mil of coating still in place.

Figure XI shows a photograph of a low carbon steel flame tube, 11 feet in length, being fired in a vertical position to mature a heat resistant base coat about 4 mils thick. An insulating and radiation reflecting top coat, about 8 mils thick, was later applied and fired in the same way. The size of the industrial furnace used can be inferred from the length of the tube. In service tests at Wright Field, uncoated tubes of this type were found to run red hot with subsequent metal warping. In tests of coated tubes, the metal ran dark and did not deform.

SUMMARY

1. Heat resistant ceramic coatings can be used to protect metals from the effects of high temperatures for long periods of time.

2. Mild steel can be used at very considerably increased temperatures when proper ceramic coatings are applied. Alloy metals usually coat readily and show improved performance under certain conditions of high temperature and vibration.

3. Coating development calls for the use of some materials not ordinarily used, and for a somewhat modified view point regarding costs and objectives.

4. A new conception of firing technique is involved. As operating temperatures go up, coatings designed for metal protection must, of course, be fired at even higher temperatures. Special furnace refractories and heating elements must be considered. Even though this involves greater cost, the value of the product probably warrants it.

5. Test methods must include all of the unusual conditions to which high temperature coatings would be subjected in actual service. Various illustrations of specimen preparation and test results are shown in this paper.

6. The uses for high temperature ceramic coatings are many indeed. A few specific applications are given or suggested.

Acknowledgments

The author wishes to acknowledge the helpful suggestions of A. I. Andrews, Head of the Department of Ceramic Engineering, University of Illinois. C. M. Andrews, and more recently W. J. Plankenhorn, Terry Newkirk, and J. E. Comefore cooperated effectively in the development of high temperature coatings on this project.

Technical advice and supporting investigations on metals were contributed by Frank Porter, Inland Steel Co.; Rudyard Porter and others of Carnegie-Illinois Steel Co.; and J. J. Canfield, of American Rolling Mill Co.

Walter Bruckner, Department of Metallurgy, U. of I., very kindly prepared a number of photomicrographs of sectioned coated metal.

The A. O. Smith Corp., Milwaukee, Wis., made available their facilities for firing unusually large parts.

The Power Plant Laboratory, of the Air Materiel Command, Wright Field, Dayton, Ohio, supplied parts and subjected them to service tests after ceramic coatings were applied. It was at all times promptly cooperative in obtaining certain metals and materials that would not otherwise have been available for test purposes.

Production and enameling problems with non-enameling iron

(Continued from Page 18)

eling steels are boiling or blistering and warpage. Unfortunately, I don't believe it can be positively stated why with two lots of low carbon sheets showing the same analysis and having the same treatment, one will blister and one will not, but such is the case. In a majority of the cases where blistering is encountered, a change in pickle practice will help the condition. Usually less time in the acid produces the best results but, unfortunately, this is not always true. In some instances a longer pickle is required to give satisfactory performance, and in still other cases it is necessary to anneal to correct the condition. In general, the amount of action in the pickle tank is an indication of the time required for pickling (the less action the longer the time required). This difference in surface again goes back to the fact that a cold rolled sheet is designed principally for surface or for drawing qualities and not enameling.

Special burning tools may prevent warping

Warpage from low carbon sheets is a problem that has to be faced since at enameling temperatures steel will warp considerably more than enamel iron. The seriousness of the problem depends to a great extent on whether the pieces are drawn and whether special fixtures can be designed to support the piece properly during firing.

Parts such as table tops and signs are particularly susceptible to warpage, but with special care even these parts have been run from low carbon cold rolled sheets. The warpage characteristics of steel sheets vary from lot to lot, and it is impossible to predict the amount of warpage to be expected which makes its control doubly difficult.

A well controlled nickel dip is recommended

While it is a recognized fact that most shops profit from nickel dip when running enamel iron, I believe its use is more essential when enameling steel sheets. The surface of the steel sheets vary both as to finish and oxidation characteristics which may result in either poor bond and fish-

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scale from under oxidation or copper heads from over oxidation. A well controlled nickel dip will help to minimize these nonuniformities.

Wide range ground coats help

Also, the frit companies, realizing the problems confronting the enameler, have developed special ground coats for use with steel sheets. These have a wider working range which takes into account the difference in oxidation rates of steel sheets.

It has been suggested that samples from all shipments of steel coming into the plant be sent to the enameling department to be checked for boiling or blistering and for sagging.

I would like to suggest in the blistering and boiling test that the samples be finished in white as very often the boiling does not show up until finish coat is applied. In this way, it may be possible to separate the sheets into lots which can be used for ground coat finish and those to be used for white. In like manner, the sheets showing the greatest warpage tendencies may be used for small parts where warpage is less of a hazard.

As a summary I would say, when using steel sheets all operations in the enamel plant should be controlled as closely as possible and specifically:

1. Pickle should be closely checked with, in general, a shorter time in the acid.
2. Design burning equipment to minimize warpage tendencies.
3. Nickel dip is more essential than with enamel iron, developing bond and eliminating fishscale and copper heads.
4. Use of special enamels is often advantageous.
5. Check incoming shipments for boiling or blistering and sagging; and try to schedule the sheets into parts where these defects will cause the least trouble.

It is hoped that these suggestions may be of some interest to the man in the plant, and I'm sure it is the wish of all the steel companies that conditions may soon be back to normal so they may supply all requirements for enamel iron.

Adapted for finish *from a paper before the Eighth Annual Porcelain Enamel Institute Forum.*

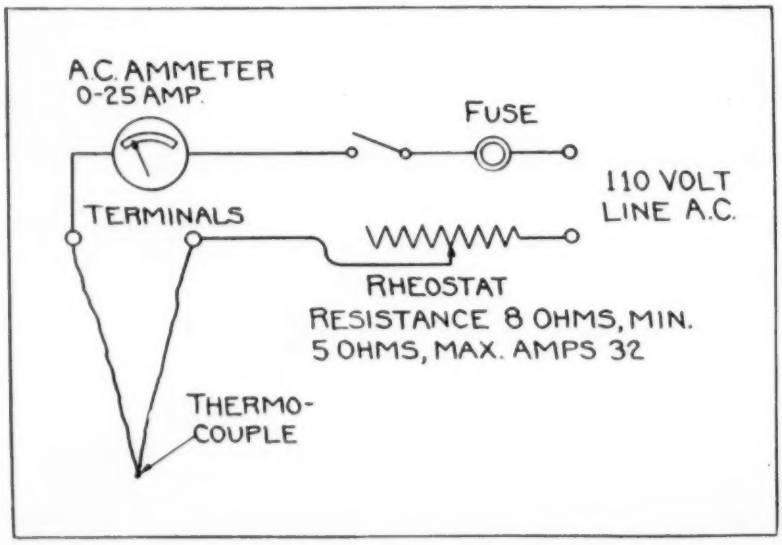
Temperature control of enameling furnaces

(Continued from Page 23)

flux when welding chromel-alumel couples but is not necessary for noble metals. Any flux should be washed off of the junction after welding as it will continue to slag the metal.

The annealing of the welds and junction of noble metal thermocouples is desirable to give the couple a uniform condition. Figure IV. shows the equipment necessary. An amperage necessary to heat the thermocouple wire to a bright red heat is used. Contaminated surface areas will appear black but in a half hour to an hour will clear up and the whole couple will be uniformly bright.

Figure V.
Annealing Equipment



Optical pyrometer

An optical pyrometer is based on the principle that the intensity of radiation of a particular wave length of light bears a definite relation to the temperature of the light source. In the optical pyrometer the intensity of the light from the heated body is compared by eye with that of an electrically lighted filament. By calibrating the current necessary to bring the filament to certain temperature brightnesses, the instrument can be used for measuring temperature.

Radiation pyrometer

In recent years the radiation type of pyrometer has made notable strides. It depends upon the principle that the total radiation of a black body is proportional to the fourth power of the absolute temperature. In this instrument the total radiations from a given area in the furnace are focused onto a small thermopile. A thermopile is a multiple thermocouple arrangement so that an appreciable EMF can be obtained from a small change in temperature. The radiations from the furnace focused onto the thermopile cause its temperature to rise, depending on the intensity of these radiations. A galvanometer or potentiometer is used to indicate the EMF developed between the hot junction of the thermopile and the cold junction at the other end of the extension leads. By calibrating these relations, the instrument is made suitable for determining the temperature in the furnace.

A radiation pyrometer has advantages over the optical pyrometer in that it can be made recording, is strictly automatic and can, therefore, also be used to regulate the control equipment of a furnace. It

to Page 56 →

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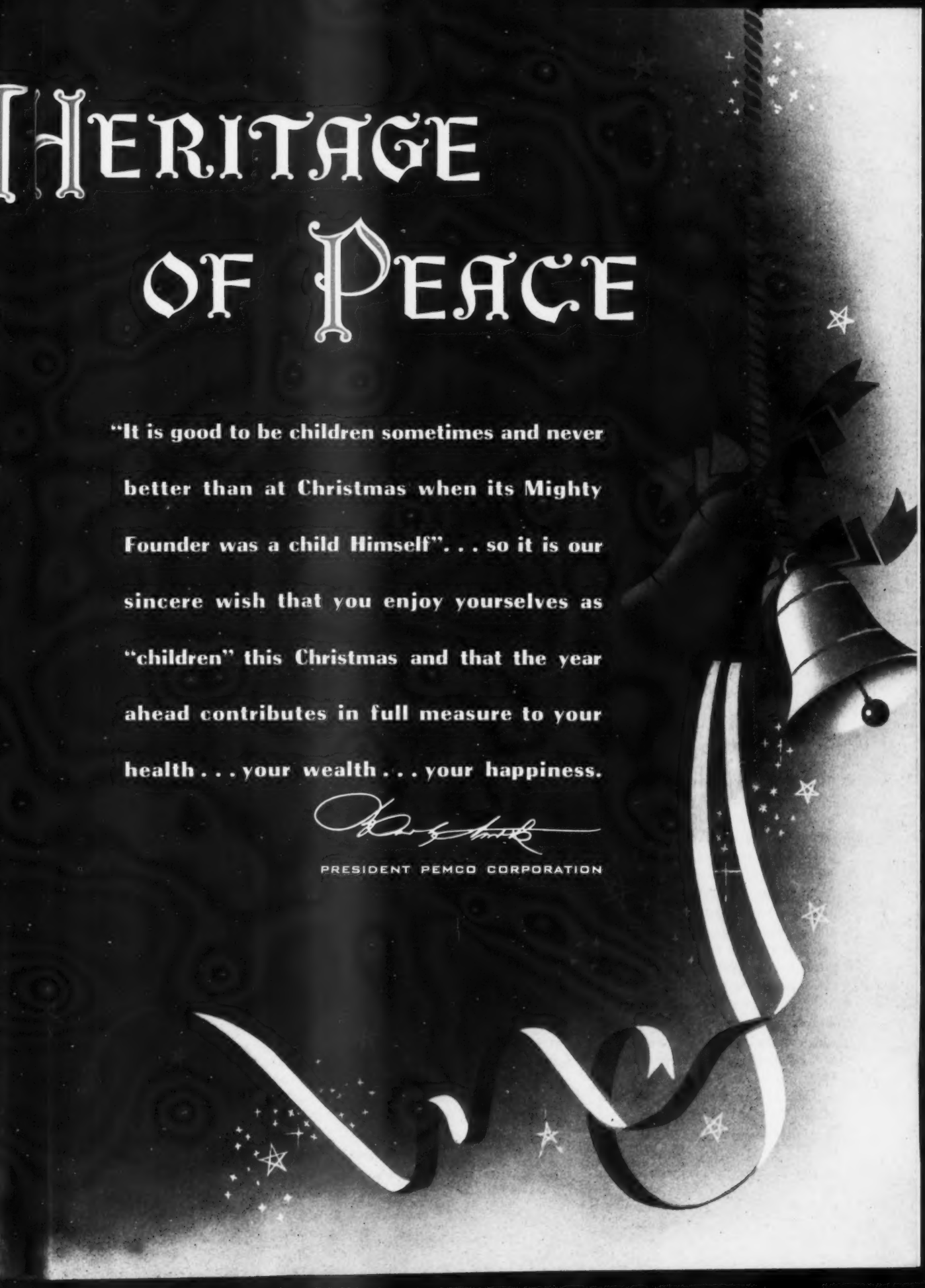

→ *from Page 52*

can be sighted on the ware being heated, or in fact any place where the control of the temperature is desired. These instruments are in use for firing enamels and will probably be more common. Since they are entirely outside of the furnace, the upkeep is not great.

Melting point salts

Melting point salts are sometimes used to explore the temperature conditions in different parts of a furnace. These salts are made up in pellets which will melt at different temperatures. By placing them in various locations in the charge, information is gained concerning the maximum temperatures reached. By watching the pellets or by prematurely removing the charge from the furnace, as is possible with the box type furnace, further information can be gained concerning the rates at which different parts of the ware are heated.

Porcelain enamel institute fifteenth annual meeting

(Continued from Page 34)

the Architectural Division of the Porcelain Enamel Institute organized in July, 1945. This committee has developed standards for the manufacturer of architectural porcelain enamel, standards for its erection and short form specifications. Its promotional activity includes a brochure, and catalogue and trade publication advertising to architects.

Department of Commerce representative speaks

At an Institute luncheon meeting on Thursday, October 24, S. Morris Livingston, of the Bureau of Business Economics, U. S. Department of Commerce, advised PEI members to base their plans on the fact that there are temporary and unstable elements in the current strong demand for goods. "Continuation of the present boom," he said, "depends on inventory accumulation at a rate which may continue for some time but obviously cannot go on forever. Once the production and distribution pipe line is filled, the total volume of goods available to consumers will no longer be deficient relative to the demand for those goods. Shortages will be the exception rather than the rule.

"The excess of government expenditures over government receipts, which was still an important inflationary influence in the early part of 1946, has now disappeared. From now on there should be a surplus which will offset rather than encourage inflationary tendencies. Present tax rates will take an important share of any increase in incomes resulting from increased production, higher prices and wage rates."

While the boom may go so far as to require serious readjustments, Mr. Livingston ruled out the possibility of "another 1932 depression in the next year or so." He argued that average business volume over the next several years should be well above the pre-war level.

Mr. Livingston made three specific suggestions: Watch your inventories, prepare to reduce production costs, and prepare to SELL once more.

Porcelain enamel for prefabs discussed

At the annual banquet, Paul O. Nafe, director of public relations for Gunnison Homes, described manufacturing operations keyed to the production of a complete home every twenty-five minutes. He advised porcelain enamelers to be careful in their affiliation with prefabricated housing projects due to the experience required for successful operation. He described a Gunnison research project now under way for placing more emphasis on the use of porcelain enameled steel in prefab homes. Some of the components mentioned included shutters, trim, chimney tops, outside fireplace chimneys, and window boxes. Mr. Nafe outlined some of the features of porcelain enameled steel which make it adaptable for housing use, including *dimensional stability, fabricating speed, variety and permanence of color and freedom from upkeep.*

For the most part, architectural porcelain enamel used to date has been for commercial or industrial installations. The prefabricated home would seem to offer a complete new market for enameled steel.

Second "olde timers" banquet a big success

Wednesday night's "Olde Timers" banquet was a sparkling success for both old timers and new timers alike. Spike Spencer, grand mogul of the clan, and Bennett Chapple, reigning toastmaster, competed with some degree of success with the many "would-be speakers" who demanded an opportunity to express their sentiments with regard to porcelain enamel and porcelain enamelers in general.

Hommel takes top golf honors

For those who had the stamina to play the "hill course" at French Lick, there were prizes and honor awaiting. The president's cup, top honor at PEI golf matches, went to Ernest Hommel for low gross.

NEWS

The first autumn meeting of the Virginia Polytechnic Institute Student Branch of the American Ceramic Society met October 28, at the department building.

Mr. G. M. Boyd, faculty councellor for the Chapter, introduced Professor John W. Whittemore, head of the Department of Ceramic Engineering at the Institute, who addressed the meeting and briefly reviewed the possibilities for the Branch for the coming year.

The following officers were elected and installed: R. W. Crowell, president; A. A. DiNubila, vice president; Miss Ella MacDesmond, recording secretary-treasurer; and W. E. Hall, corresponding secretary.

Weaver on the air

R. A. Weaver, Ferro president, was on the air Saturday, November 16, in connection with a special broadcast of the Cleveland Orchestra sponsored by Ferro Enamel Corp.

In his "Greetings from Cleveland, Ceramic Capital of the World," Weaver sketched the rich background of porcelain enamel and outlined its modern uses for the radio listeners.

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